Internal Use Only

Service Manual

LG-A175

Date: March, 2011 / Issue 1.0

Table Of Contents

1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common-carrier telecommunication service of facilities accessed through or connected to it.

The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the this phone or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on this model must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

Phone may interfere with sensitive laboratory equipment, medical equipment, etc.Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated  by the sign. Following information is ESD handling:

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

1.3 Abbreviations

For the purposes of this manual, following abbreviations apply:

APC	Automatic Power Control
BB	Baseband
BER	Bit Error Ratio
CC-CV	Constant Current – Constant Voltage
DAC	Digital to Analog Converter
DCS	Digital Communication System
dBm	dB relative to 1 milli watt
DSP	Digital Signal Processing
EEPROM	Electrical Erasable Programmable Read-Only Memory
ESD	Electrostatic Discharge
FPCB	Flexible Printed Circuit Board
GMSK	Gaussian Minimum Shift Keying
GPIB	General Purpose Interface Bus
GSM	Global System for Mobile Communications
IPUI	International Portable User Identity
IF	Intermediate Frequency
LCD	Liquid Crystal Display
LDO	Low Drop Output
LED	Light Emitting Diode
OPLL	Offset Phase Locked Loop

PAM	Power Amplifier Module
PCB	Printed Circuit Board
PGA	Programmable Gain Amplifier
PLL	Phase Locked Loop
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RLR	Receiving Loudness Rating
RMS	Root Mean Square
RTC	Real Time Clock
SAW	Surface Acoustic Wave
SIM	Subscriber Identity Module
SLR	Sending Loudness Rating
SRAM	Static Random Access Memory
PSRAM	Pseudo SRAM
STMR	Side Tone Masking Rating
TA	Travel Adapter
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Control Temperature Compensated Crystal Oscillator
WAP	Wireless Application Protocol

2. PERFORMANCE

2.1 H/W Features

Item	Feature	Comment
Standard Battery	Lithium-ion r, 3.7V 950mAh	
Stand by TIME	1500hr @ Paging Period 9, RSSI 85dBm	
Talk time	11hr @ GSM Tx Level 10	
Charging time	Approx. 4 hours	
RX Sensitivity	GSM, EGSM: -108dBm, DCS: -108dBm	
TX output power	GSM, EGSM: 32.5dBm(Level 5), DCS , PCS: 29.5dBm(Level 0)	
GPRS compatibility	Not Support	
SIM card type	3V Small	
Display	MAIN : 1.52" TFT 128 × 128 pixel 262K Color	
Status Indicator	Hard icons. Key Pad 0 ~ 9, #, *, Up/Down Left/Right Navigation Key Send Key, PWR Key ,Soft Key(Left/Right)	
ANT	Internal	
EAR Phone Jack	Yes	
PC Synchronization	Not Support	
Speech coding	EFR/FR/HR	
Data and Fax	Not Support	
Vibrator	Yes	
Loud Speaker	Yes	
Voice Recoding	Not Support	
Microphone	Yes	

Item	Feature	Comment
Speaker/Receiver	18x12Φ Speaker/ Receiver	
Travel Adapter	Yes	
MIDI	32 poly	
Camera	Not Support	
FM Radio	87~108MHz supported	

2.2 Technical Specification

<table>
<tr><th>Item</th><th>Description</th><th colspan="6">Specification</th></tr>
<tr><td>1</td><td>Frequency Band</td><td colspan="6">GSM850/EGSM
TX: 880 ~ 915MHz
RX: 925 ~ 960 MHz

DCS/PCS
TX: 1710 ~ 1785 MHz
RX: 1805 ~ 1880 MHz</td></tr>
<tr><td>2</td><td>Phase Error</td><td colspan="6">RMS < 5 degrees
Peak < 20 degrees</td></tr>
<tr><td>3</td><td>Frequency Error</td><td colspan="6">< 0.1 ppm</td></tr>
<tr><td rowspan="22">4</td><td rowspan="22">Power Level</td><td colspan="6">GSM850/EGSM</td></tr>
<tr><td>Level</td><td>Power</td><td>Toler.</td><td>Level</td><td>Power</td><td>Toler.</td></tr>
<tr><td>5</td><td>33dBm</td><td>±2dB</td><td>13</td><td>17dBm</td><td>± 3dB</td></tr>
<tr><td>6</td><td>31dBm</td><td>±3dB</td><td>14</td><td>15dBm</td><td>± 3dB</td></tr>
<tr><td>7</td><td>29dBm</td><td>±3dB</td><td>15</td><td>13dBm</td><td>± 3dB</td></tr>
<tr><td>8</td><td>27dBm</td><td>±3dB</td><td>16</td><td>11dBm</td><td>± 5dB</td></tr>
<tr><td>9</td><td>25dBm</td><td>±3dB</td><td>17</td><td>9dBm</td><td>± 5dB</td></tr>
<tr><td>10</td><td>23dBm</td><td>±3dB</td><td>18</td><td>7dBm</td><td>± 5dB</td></tr>
<tr><td>11</td><td>21dBm</td><td>±3dB</td><td>19</td><td>5dBm</td><td>± 5dB</td></tr>
<tr><td>12</td><td>19dBm</td><td>±3dB</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">DCS/PCS</td></tr>
<tr><td>Level</td><td>Power</td><td>Toler.</td><td>Level</td><td>Power</td><td>Toler.</td></tr>
<tr><td>0</td><td>30dBm</td><td>±2dB</td><td>8</td><td>14dBm</td><td>± 3dB</td></tr>
<tr><td>1</td><td>28dBm</td><td>±3dB</td><td>9</td><td>12dBm</td><td>± 4dB</td></tr>
<tr><td>2</td><td>26dBm</td><td>±3dB</td><td>10</td><td>10dBm</td><td>± 4dB</td></tr>
<tr><td>3</td><td>24dBm</td><td>±3dB</td><td>11</td><td>8dBm</td><td>± 4dB</td></tr>
<tr><td>4</td><td>22dBm</td><td>±3dB</td><td>12</td><td>6dBm</td><td>± 4dB</td></tr>
<tr><td>5</td><td>20dBm</td><td>±3dB</td><td>13</td><td>4dBm</td><td>± 4dB</td></tr>
<tr><td>6</td><td>18dBm</td><td>±3dB</td><td>14</td><td>2dBm</td><td>± 5dB</td></tr>
<tr><td>7</td><td>16dBm</td><td>±3dB</td><td>15</td><td>0dBm</td><td>± 5dB</td></tr>
</table>

Item	Description	Specification	
5	Output RF Spectrum (due to modulation)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-63
		3,000~ <6,000	-65
		6,000	-71
		DCS/PCS	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-65
		3,000~ <6,000	-65
		6,000	-73
6	Output RF Spectrum (due to switching transient)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBm
		400	-19
		600	-21
		1,200	-21
		1,800	-24

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="6">6</td><td rowspan="6">Output RF Spectrum
(due to switching
transient)</td><td colspan="3">DCS/PCS</td></tr>
<tr><td colspan="2">Offset from Carrier (kHz).</td><td>Max. dBm</td></tr>
<tr><td colspan="2">400</td><td>-22</td></tr>
<tr><td colspan="2">600</td><td>-24</td></tr>
<tr><td colspan="2">1,200</td><td>-24</td></tr>
<tr><td colspan="2">1,800</td><td>-27</td></tr>
<tr><td>7</td><td>Spurious Emissions</td><td colspan="3">Conduction, Emission Status</td></tr>
<tr><td>8</td><td>Bit Error Ratio</td><td colspan="3">GSM850, EGSM
BER (Class II) < 2.439% @-102 dBm
DCS,PCS
BER (Class II) < 2.439% @-100 dBm</td></tr>
<tr><td>9</td><td>RX Level Report Accuracy</td><td colspan="3">±3 dB</td></tr>
<tr><td>10</td><td>SLR</td><td colspan="3">14±4 dB</td></tr>
<tr><td rowspan="10">11</td><td rowspan="10">Sending Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>0</td><td>-12</td></tr>
<tr><td>1,000</td><td>0</td><td>-6</td></tr>
<tr><td>2,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,400</td><td>4</td><td>-9</td></tr>
<tr><td>4,000</td><td>0</td><td>-</td></tr>
<tr><td>12</td><td>RLR</td><td colspan="3">2±3 dB</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="11">13</td><td rowspan="11">Receiving Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>2</td><td>-7</td></tr>
<tr><td>500</td><td>*</td><td>-5</td></tr>
<tr><td>1,000</td><td>0</td><td>-5</td></tr>
<tr><td>3,000</td><td>2</td><td>-5</td></tr>
<tr><td>3,400</td><td>2</td><td>-10</td></tr>
<tr><td>4,000</td><td>2</td><td></td></tr>
<tr><td colspan="3">* Mean that Adopt a straight line in between 300 Hz and 1,000 Hz to be Max. level in the range.</td></tr>
<tr><td>14</td><td>STMR</td><td colspan="3">Over 17 dB</td></tr>
<tr><td>15</td><td>Stability Margin</td><td colspan="3">> 6 dB</td></tr>
<tr><td>16</td><td>System frequency (13 MHz) tolerance</td><td colspan="3">≤ 2.5 ppm</td></tr>
<tr><td>17</td><td>32.768KHz tolerance</td><td colspan="3">≤ 30 ppm</td></tr>
<tr><td>18</td><td>Ringer Volume</td><td colspan="3">At least 65 dBspl under below conditions:
1. Ringer set as ringer.
2. Test distance set as 50 cm</td></tr>
<tr><td>19</td><td>Charge Current</td><td colspan="3">Fast Charge : Typ. 410 mA
Total Charging Time : < 3.5 hours</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="2">Specification</th></tr>
<tr><td rowspan="7">20</td><td rowspan="7">Antenna Display</td><td>Bar Number</td><td>Power</td></tr>
<tr><td>5</td><td>-92 ± 2</td></tr>
<tr><td>5 -> 4</td><td>-93 ± 2</td></tr>
<tr><td>4 -> 2</td><td>-101± 2</td></tr>
<tr><td>2 -> 1</td><td>-104 ± 2</td></tr>
<tr><td>1 -> 0</td><td>-106 ± 2</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="5">21</td><td rowspan="5">Battery Indicator</td><td>Battery Bar Number</td><td>Voltage</td></tr>
<tr><td>3</td><td>> 3.75± 0.05 V</td></tr>
<tr><td>3 -> 2</td><td>3.74 ± 0.05 V</td></tr>
<tr><td>2 -> 1</td><td>3.63 ± 0.05 V</td></tr>
<tr><td>1 -> 0</td><td>3.57 ± 0.05 V</td></tr>
<tr><td rowspan="2">22</td><td rowspan="2">Low Voltage Warning
(Blinking Bar)</td><td colspan="2">1 time per 1 minute (Receiver)</td></tr>
<tr><td colspan="2">1 time per 3 minutes(Speaker)</td></tr>
<tr><td>23</td><td>Forced shut down
Voltage</td><td colspan="2">3.3 ± 0.05V</td></tr>
<tr><td>24</td><td>Battery Type</td><td colspan="2">Lithium-Ion Battery
Standard Voltage = 3.7 V
Battery full charge voltage = 4.2 V
Capacity: 950mAh</td></tr>
<tr><td>25</td><td>Travel Charger</td><td colspan="2">Switching-mode charger
Input: 100 ~ 240V, 50/60 Hz
Output: 4.8 V, 400 mA</td></tr>
</table>

3. TECHNICAL BRIEF

3.1 Digital Main Processor

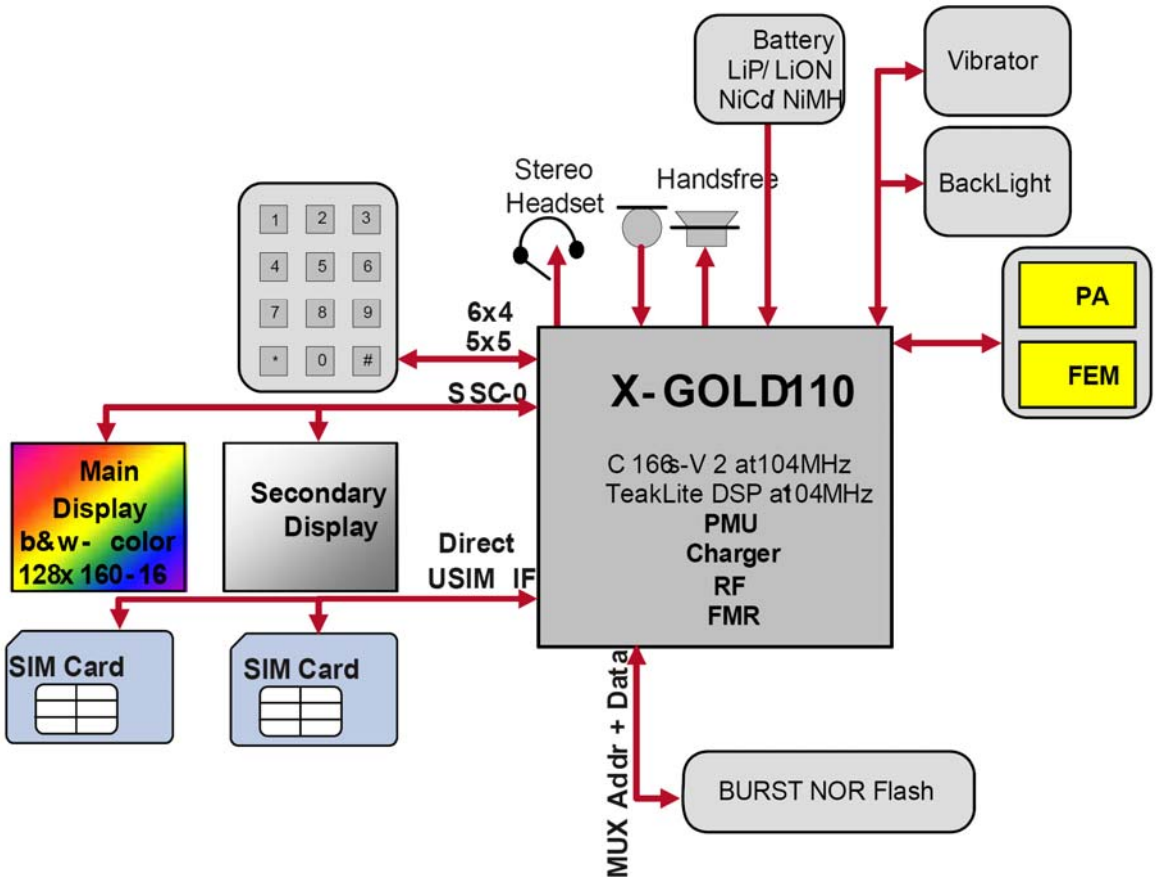


Figure. 3.1.1 X-Gold tm 110 Hardware Block Diagram

3.1.1 General

Technology:
– SoC, Monolithic, 65 nm CMOS
• Package:
– WFWLB, 8x8x0.8 mm
– 0.5 mm pitch
– 217 balls

3.1.2 RF Transceiver

• Dual-band direct conversion receiver
• Tri/Quad-band possible with external circuitry
• Fully integrated digital controlled X0
• Additional buffer for 2 external system clocks
• Fully digital RF-Synthesizer incl. ΣΔ-Transmitter

3.1.3 Baseband

• High performance fixed-point TEAKlite DSP
• C166S-V2 high performance microcontroller with a 16KB Instruction Cache and a Data cache Buffer.
• FM Stereo Radio Receiver with RDS
• There are several Interfaces:
– I2S interface for DAI connections (for Tape Approval) and external Audio component connection.
– High Speed SSC Interface for connection of companion chips (like Serial SD Cards)
– High Speed SSC Interface dedicated to Display control
– USIM Interface with support of Protocol T=1 and Dual USIM support.
– Keypad Interface (6x4 or 5x5 keys)
– External Memory Controller (EBU) for external RAM/NOR FLASH/Busrt Flash/NAND Flash/Serial Flash (SPI/SQI) and Parallel Display connection
– Asynchronous serial interface.
– Asynchronous serial interface for WLAN/BT/GPS control (incl. IrDA support capability) .
– JTAG Interface, OCDS, Multi-Core Debug and Real Time Trace facilities.
– Black & white and 128x160 - 16bit color displays are supported
– PWM source to drive vibrator
– Keypad and display backlight supported.
– HASH Unit support for hashing.

Crystal Oscillator
• Fully digital controlled crystal oscillator core with a highly linear tuning characteristic

Mixed Signal and Power Management Unit
• Embedded stepdown converter (1.8V)
• DC/DC boost for voltages up to 15 V for driving White or Blue LEDs
• 8-Ω loud speaker driver (700 mW)
• 16-Ω earpiece driver
• 32-Ω headset driver
• Measurement interfaces (PA temperature, battery voltage, battery temperature, and ambient temperature)
• Accessory Detection
• PCB ID detection as part of measurement interface.
• Differential microphone input
• System start up circuitry
• Charger circuitry for NiCd, NiMh and LiIon cells with integrated Control Current/Voltage Charging.
• Integrated regulators for direct connection to battery.

C166S-V2 Buses
The C166S-V2 is connected to four buses:
1. IMB (Internal Program) bus (64b - 0 cycle instruction bus))
2. DPMI (Data-Program) Bus (16b - 0 cycle data bus)
3. X-Bus (16b - 3 cycle peripheral bus)
4. PD-Bus (16b 0 cycle peripheral bus)

Bus Interconnections
The interconnection between the X-Bus and the TEAKlite Bus uses:
• Multicore Synchronization
• Shared Memory.

3.1.4 FM Radio

• Integrated FM radio
– FM Stereo RDS Receiver
– Sensitivity 2 μV EMF
– Support for US & EU bands
– Stereo recording

3.1.5 Display

• Type
– 128*128, QQVGA, 262k TFT color (parallel)
• Interface
– Parallel 8/9bit MIPI-DBI Type B
– Interf. voltage at 1.8V or 2.8V
• gRacr - Display Controller (Hardware)
– 30 fps Display update without DMA (up to 60 fps) (full or partial)
– Video post processing Scaling, Rotation (90° steps), Mirroring
– Overlay with alpha blending
– Color conversion YUV -> RGB
– 2D vector graphics (Lines, filled rectangles, Bit block transfer (e.g. sprites, scrolling, antialiased bitmap fonts)

3.2 Power Management

A mobile platform requires power supplies for different functions. These power supplies are generated in the integrated power management Unit (PMU). The PMU is designed to deliver the power for a typical standard phone.

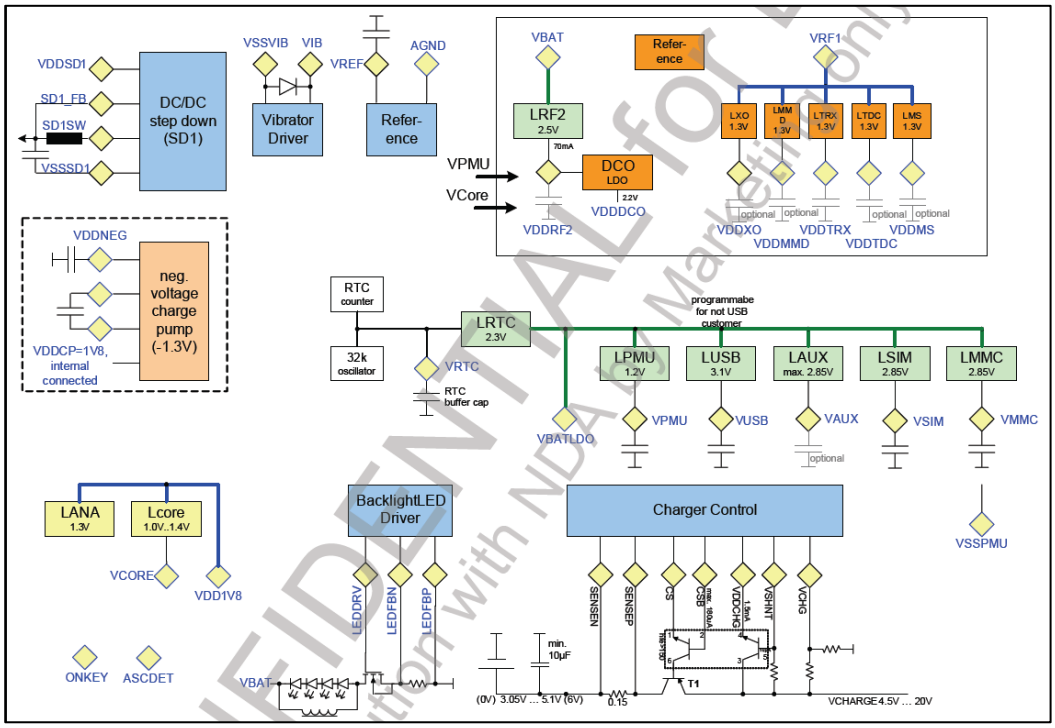


Figure. 3-2-1 Block Figure of the PMU Modules X-Gold tm 110

▪ DC/DC Step Down Converter for 1.8V (SD1)

The DC/DC converter generates a 1.8 V supply rail. This voltage rail is used to supply main parts of the system, like the digital core of the chip (via LDO LCORE), parts of the mixed signal macro, parts of the RF macro and the external memory if a 1.8V memory is used.

▪ **Linear voltage Regulators (low dropout) LDOs**
The LDOs are used to generate the supply for the different supply domains not directly supplied out of the DC/DC converter.

▪ **LCORE**
The LCORE LDO provides the VCORE supply used for most of the digital parts of the chip

▪ **LPMU**
The LPMU provides VPMU sued for the PMU supply, e.g. for the startup state machine and analog parts like ADC, sense amplifier etc.

▪ **LAUX**
The LAUX generates VAUX. It is a general purpose LDO and can be used for different functions depending on the phone application, e.g. for the display or Camera.

▪ **LSIM**
The LSIM LDO generates the VSIM supply for the SIM card and interface. It is designed to supply Standard SIM cards.

▪ **Other LDOs**
The RF module has implemented several LDO's for different RF Power domain.
The mixed signal module has some LDO's for the audio driver and microphone supply.

Supply Domain LDO Name	Voltage	Max. Current	Output Cap	Input Domain	Comment
VBAT	0 ... 6.0 V				Operating range is 3.05 V ... 5.5 V, system emergency switch off voltage is about 2.8 V
VDD1V8	1.8 V	450 mA	22 µF optional 10 µF	VBAT	This voltage is generated by the DC/DC converter with 3.3 µH inductor, (10 µF output cap is preferred but needs to be checked) The voltage is used for: Memory supply, and via LDOs for digital core supply, mixed signal supply and RF supply.
LCORE	1.2 V	100 mA	2x100 nF	VDD1V8	Assumption: C166 core clock 104 MHz, DSP clock 104 MHz
LANA	1.3 V	10 mA	No	VDD1V8	No ball
LRTC	2.3 V	2 mA	>=100 nF	VBAT	This supply is only used for the HPBG, the 32.768 kHz oscillator and the real-time clock counter required during the sleep- and low-power mode.
LPMU	1.3 V	15 mA	100 nF	VBAT	Supply for the digital part of the PMU including digital control of DC/DC converter. This voltage is also used for the N-DEMOS driver of DC/DC converter and the class-D amplifier and the core PLL.
LAUX	1.5 V ... 2.85 V	150 mA	>=470 nF	VBAT	General purpose LDO for e.g. Display, Bluetooth, Camera etc. Programmable output voltages are (1.5 V, 1.8 V, 2.5 V, 2.85 V)
LSIM	1.8 V / 2.85 V	30 mA	>=100 nF	VBAT	LDO dedicated to the SIM-Card supply. It is chip internal connected to the SIM interface driver.
VDDNEG	-1.3 V	100 mA	100 nF	VDD1V8	Negative voltage for the bipolar headset audio driver. Generated by a charge pump.

Table. 3-2-1 Power supply Domains (without RF)

3.2.1 Power on and startup

- **Analog startup Circuit**

Because the POR circuit and the LPBG are directly connected to the battery, it is not possible to switch them off. If the battery voltage exceed the power on reset threshold (2.5V), the power on reset is released, the LPMU regulator and the LRTC voltage regulator are switched on. The LPMU regulator starts in its ultra-low power mode

The LPMU regulator generates a control signal (lpmu_OK) that enables the 50KHZ PMU oscillator. The output clock of the oscillator is checked with a fully coded counter. A counter overflow releases the reset (vpmu_rst_n) signal for the small PMU state-machine.

- **Small first digital State-Machine**

The small PMU state-machine is always connected to VPMU After starting from reset the small startup state machine enters the SYSTEM OFF state and only continuous the startup procedure if a switch on event like first connect, on-key, wake up or charge detect occurs.

- **PMU-main State-Machine**

The main PMU state-machine is always connected to VPMU also. The power up sequence driven by the PMU state-machine can be seen in Figure18. After enabling the reference (HPGB) and waiting for the settling time, the battery voltage is measured and compared with the power on threshold. If the battery voltage is high enough, the SD1 DC/DC converter and the LCORE LDO are started. A timer ensures that the supply voltage will be stable before the DCXO is enabled. The DCXO settling time is ensured using a fixed timer. After an overflow of this timer, the reset is released for the rest of the system. The PMU state machine remains in this System-ON state until the system is switched into the OFF state. For example the system sleep mode is completely configured by software(for example switching off the LDO's, switching of the DCXO etc.) and controlled by the VCXO_enable signal. The reason for the startup is stored in the ResetSourceRead register.

- **Battery Measurement**

The ADC and the oscillator for the ADC needs the VDD_ADC supply voltage from the LADC LDO. LADC uses either the charger voltage VDD_CHARGE or VDDRTC as input voltage. The input voltage is selected automatically by a bulk switch circuit. LADC, the ADC and the oscillator are enabled on request for every battery measurement if the charger unit is not running. This is handled by an ADC control block in one of the state-machines. If the charger unit is running the ADC is controlled by the charger state-machine

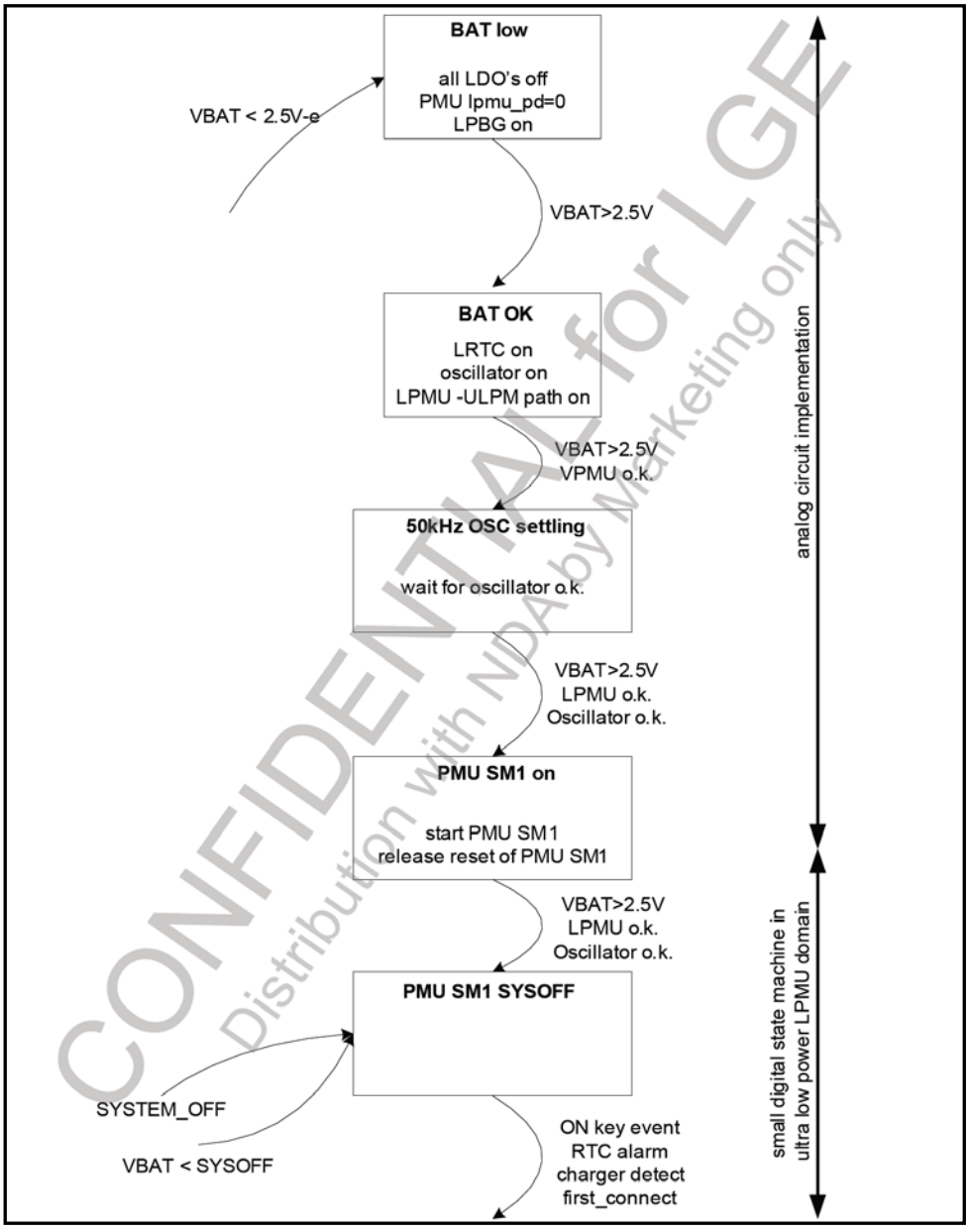


Figure.3.2.1 First Part of the State Machine, Running in Different Power Domains than the Second Part

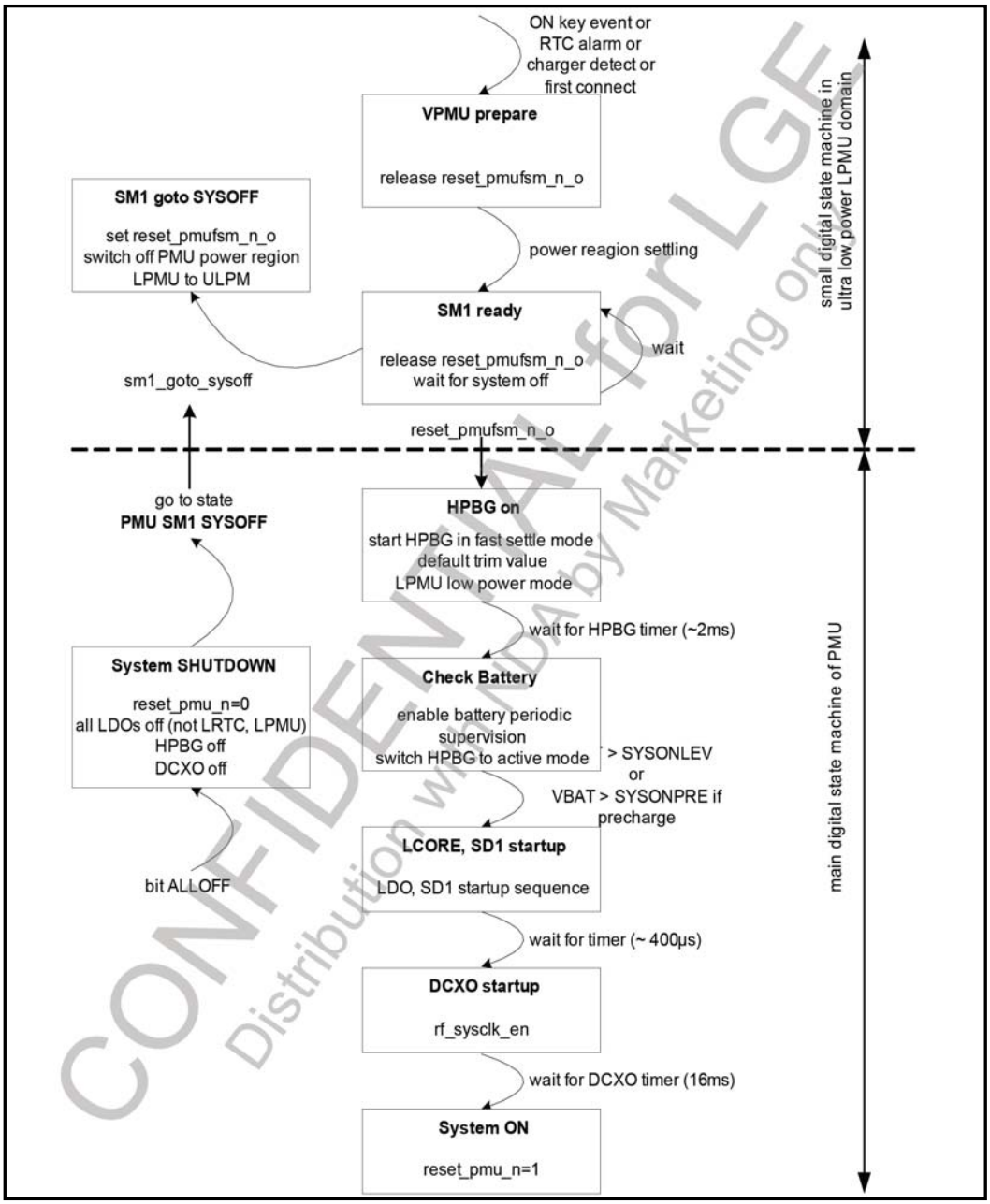


Figure 3.2.2 Second (Main) Part of the Startup State Machine in the VPMU Domain

3.2.2 Switching on due to first connect

If the battery voltage is connected the first time, that means the system enters the first time the SYSOFF state, this is stored in a first connect flag. If the first connect flag is set, the system will start immediately and not wait for any other system on event in the SYSOFF state.

3.2.3 Switching on due to on-Key event

The on key is connected to the ONKEY pad. The ESD protection and the input structure of this pad are connected to VRTC. If the ONKEY pad is forced to VRTC by an external key or similar circuit, the system starts. The ONKEY is sampled with the PMU clock. It has to be sampled four times high before a valid on event is generated. The status of the ON key can be read in the PMU registers, so it can be used as a functional key during phone operation also

3.2.4 Switching on due to RTC alarm

The real time clock can generate a wakeup signal called RTC alarm. This signal is sampled from the state-machine and after successfully detecting a high, the system is switched on.

3.2.5 Switching on due to charging

When a battery with a voltage below the SSONLEV level is inserted, the state machine will not start the system. As long as the battery voltage stays lover than SYSONLEV the system will stay off. The only possibility to start up the system is due to an external charger.

If an external charger is connected and detected and the battery is charged above the SYSONPRE voltage level the system will start up.

The PMU main state machine waits in the Check battery state until the battery voltage condition is fulfilled. The charger state machine provides the necessary pre-charge indication signal. This pre-charge signal is denounced in a small counter to have a stable signal. This is important, especially in half/full-wave charging where the charger detection is switching between charger detected/not detected according the AC supply frequency. reasons

For details on pre-charging see the charger chapter. The charger is controlled by an independent state machine. The pre-charge signal is used to trigger the pre-charge signal is used to trigger the pre-charge functionality. The charger state machine fully control the pre-charge, the PMU-state machine now changes to state HPBG on state and the system starts. This state change is indicated to the charger state-machine to
enable the charger watchdog for safety

3.2.6 Power Supply Start-up sequence

In order to avoid an excessive drop on the battery voltage caused by in-rush current during system power-on, possibly leading to system instability and “hick-ups” a staggered turn-on approach for the regulators is implemented. The regulators are turned on in a well defined sequence, thus spreading the in-rush current transients over time.

The IO’s of X-GOLD TM 213 are isolated in OFF mode (core supply is off). The isolation signal is controlled by the PMU state machine. This ensures that the PADs are in a well defined state during core supply settling. This allows to power up the LCORE core regulator and wait for the core to reach reset state before powering up the I/O supply regulators.

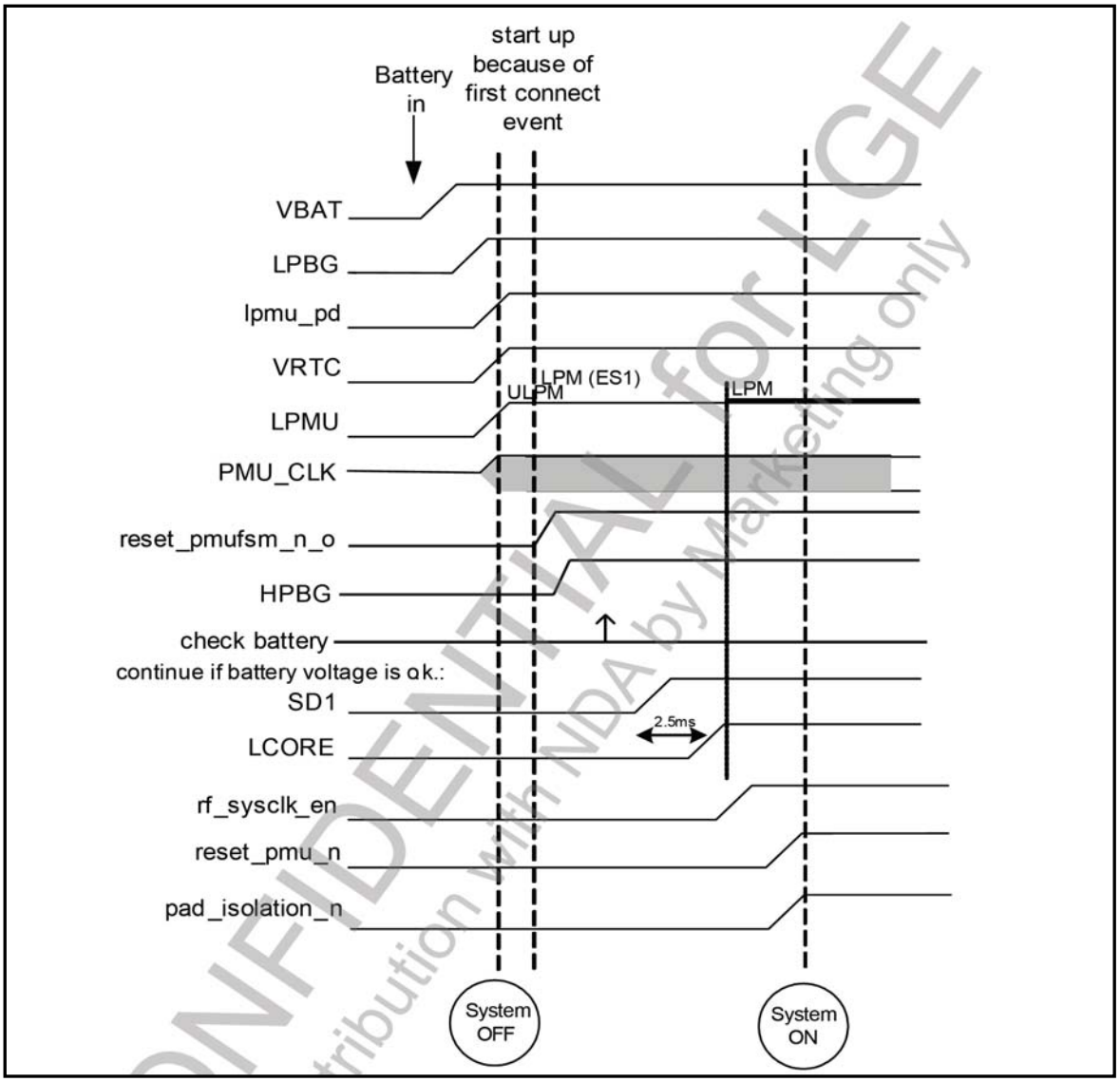


Figure 3.2.3 Start Up Sequence (triggered by First Connect Event)

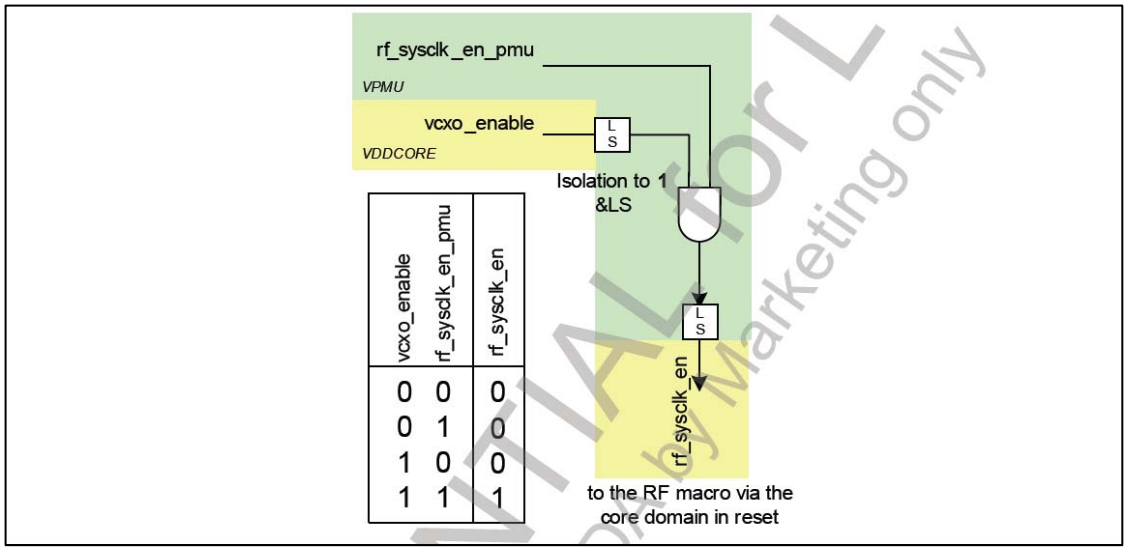


Figure 3.2.4 How sysclock Enable is Routed in the PMU

3.2.7 Sysclock Switching

The PMU controls the rf_sysclk_en signal of the DCXO in the RF macro. During startup the PMU enables the DCXO. After the system is running the DCXO is controlled by the SCU of the baseband by using the vcxo_enable signal. This is handled by a dedicated logic in the PMU, see **Figure 21**. As long as rf_sysclk_en_pmu, the output of the PMU state-machine is high, vcxo_enable controls the rf_sysclk_en signal to the RF. If rf_sysclk_en_pmu is low, the DXCO is switched off, independent from vcxo_enable.

3.2.8 Undervoltage Shutdown

In active mode the PMU periodically measures the battery voltage using the ADC from the charger unit. If the battery is measured to be below the programmable shut-down level (called SYSOFF), the system changes to OFF mode. This is done via the SHUTDOWN state of the PMU state machine. (see chapter switch OFF)

3.2.9 Silent Reset

WDT-reset and software-reset shall happen silently to ending customer: SIM card and interfaces have to stay powered and not reset by neither WDT-reset or C166s SRST instruction. To allow this, some LDO settings and some registers (as e.g. USIM_pad control register) are reset only by system-reset (HW-reset or power-on reset)

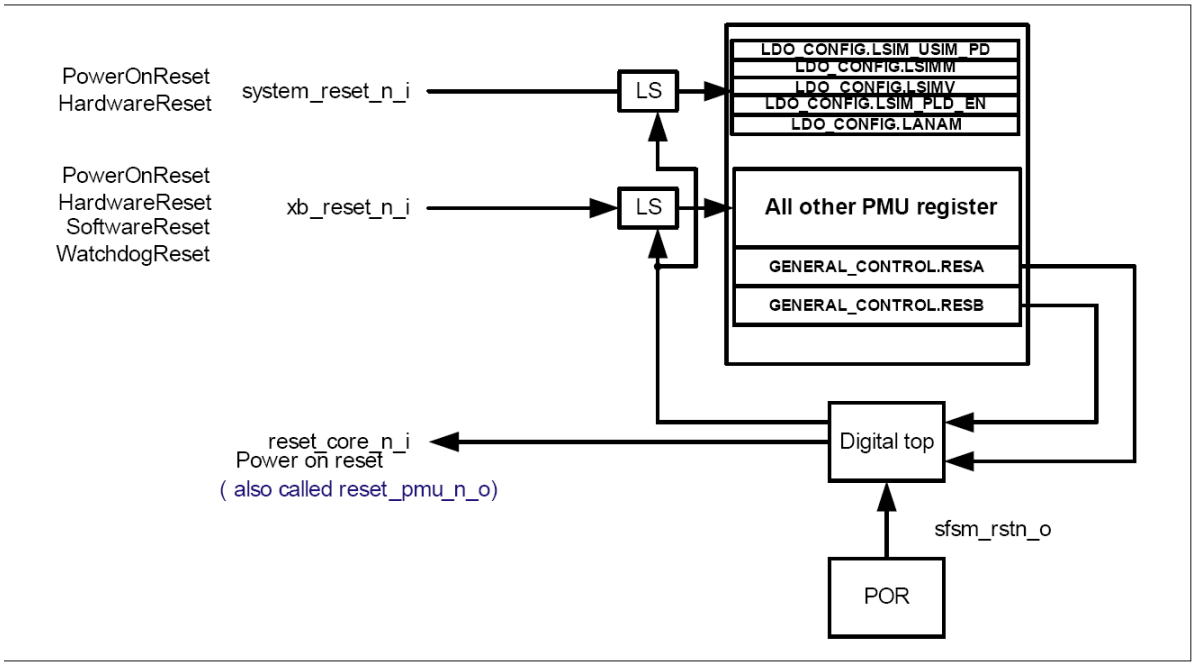


Figure 3.2.5 PMU Reset

3.2.10 PMU Clock

During the first startup (for example plugging in a battery) a PMU internal oscillator is used for generation of the PMU clock (pmu_clock). The frequency is slightly above 32 kHz (typ. 50 kHz) to be out of the audio band also for worst case devices. After first startup the software shall enable the 32 kHz crystal oscillator. It is not possible to use the 32 kHz oscillator during first startup, because the settling time of the oscillator can be quite long. After the 32 kHz oscillator is running and settled the software shall switch the PMU clock to the 32 kHz clock and disable the internal PMU oscillator for power saving reasons. The 32 kHz oscillator shall never be disabled after the PMU clock has been switched. The ADC in the charger unit has it's own oscillator generating a frequency of about 10 MHz. This oscillator is running during charging and during battery measurements triggered by the PMU. It is off otherwise.

3.2.11 System Sleep Mode

The sleep mode is controlled by using the VCXO_enable signal (dcxo_en_i) and gsm_sleep_i. These signals are used to deactivate the HPBG and setting LDO LPMU in the ultra-low-power mode. In addition the DCXO is switched off by the VCXO_enable signal. The VCXO_enable signal is also used to switch some LDO's (software configured) to sleep and/or off mode or to change the output voltages of said LDO's. The state of the main PMU state machine is not changed due to VCXO_enable.

3.2.12 DC/DC Pre-Load Register Handling

The DC/DC converter works in different modes. If the mode is switched from PFM to PWM the pulse-width of the DC/DC converter depends on the current battery voltage (and on the output voltage). The PMU state-machine knows the battery voltage because of the battery supervision function. Depending on this value it selects a startup pulse-width for the DC/DC converter out of a register table. (4-values)

3.2.13 Power Down Sequence

Setting bit OFF in the GeneralControl register switches the system into OFF mode. After the turn off event, the state-machine switches to the SHUTDOWN state. The reset_pmu_n_o signal changes to low, the I/O pads are isolated using the padisolation_n signal, the LCORE LDO and the SD1 DC/DC converter are switched off, the LPMU LDO is switched to ultra-low power mode, the DCXO is turned off and the bandgap buffer is disabled. Before switching OFF the software shall have enabled the 32 kHz oscillator and has switched the PMU clock to the 32 kHz clock to archive the target OFF current

3.3 FEM with integrated Power Amplifier Module (SKY77542/SKY77543, U401)

3.3.1 Internal Block Diagram

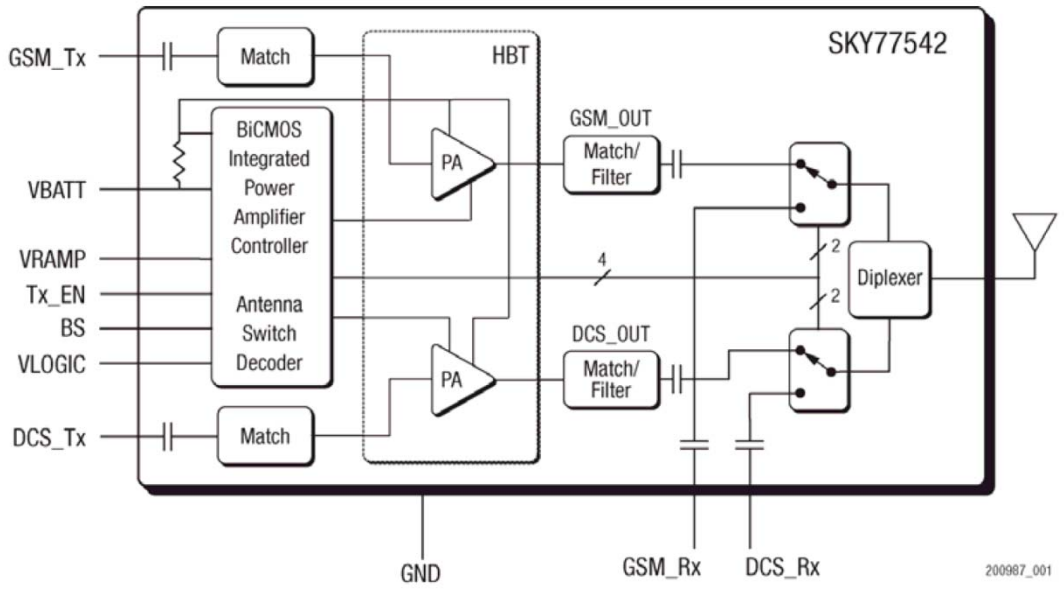


Figure. 3.3.1 SKY77542 FUNCTIONAL BLOCK DIAGRAM

3.3.2 General Description

The SKY77542 is a transmit and receive front-end module (FEM) with Integrated Power Amplifier Control (iPAC™) for dual-band cellular handsets comprising GSM900 and DCS1800 operation.Designed in a low profile, compact form factor, the SKY77542 offers a complete Transmit VCO-to-Antenna and Antenna-to-Receive SAW filter solution. The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.
The module consists of a GSM900 PA block and a DCS1800 PA block, impedance-matching circuitry for 50 Ω input and output impedances, Tx harmonics filtering, high linearity and low insertion loss PHEMT RF switches, diplexer and a Power Amplifier Control (PAC) block with internal current sense resistor. A custom BiCMOS integrated circuit provides the internal PAC function and decoder circuitry to control the RF switches. The two Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated onto a single Gallium Arsenide (GaAs) die. One PA block supports the GSM900 band and the other PA block supports the DCS1800 band. Both PA blocks share common power supply pads to distribute current.

The output of each PA block and the outputs to the two receive pads are connected to the antenna pad through PHEMT RF switches and a diplexer. The GaAs die, PHEMT die, Silicon (Si) die and passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic over mold.

Mode	VLOGIC	Input Control Bits	
		Tx_EN	BS
STANDBY	0	X [1]	X [1]
GSM_Rx	1	0	0
DCS_Rx	1	0	1
GSM_Tx	1	1	0
DCS_Tx	1	1	1

[1] X = don't care

Figure 3.3.2 Band SW Logic Table

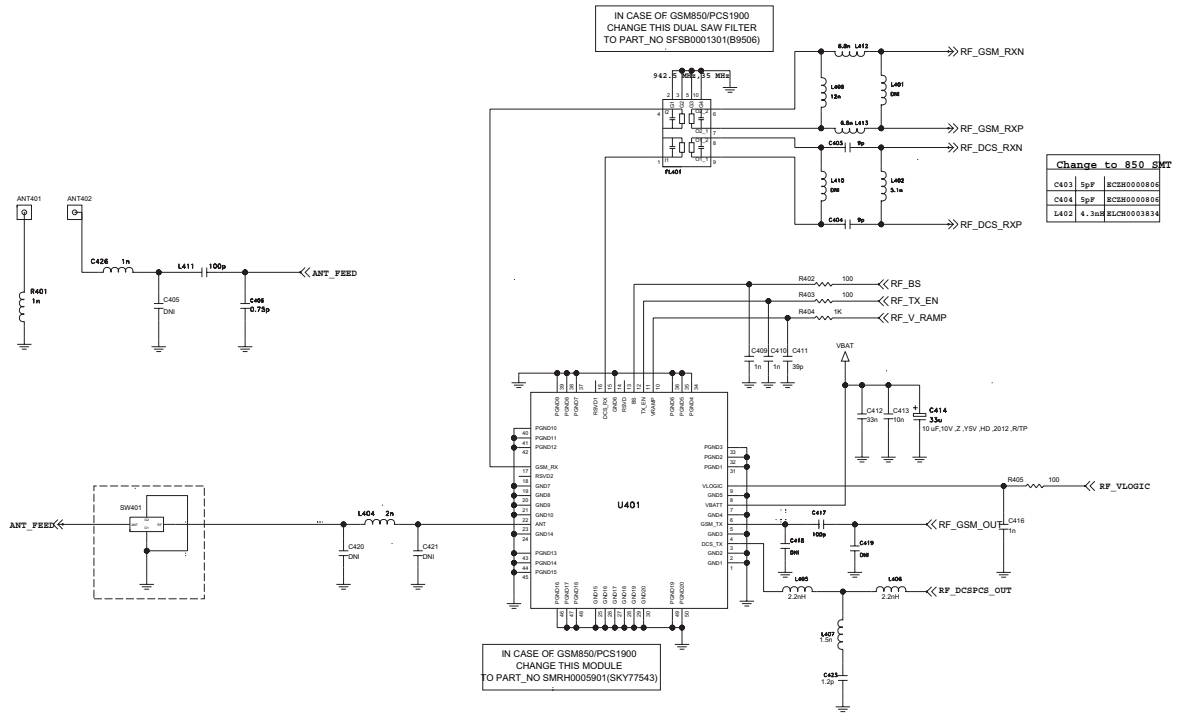


Figure 3.3.3 FEM CIRCUIT DIAGRAM

3.4 Crystal(26 MHz, X101)

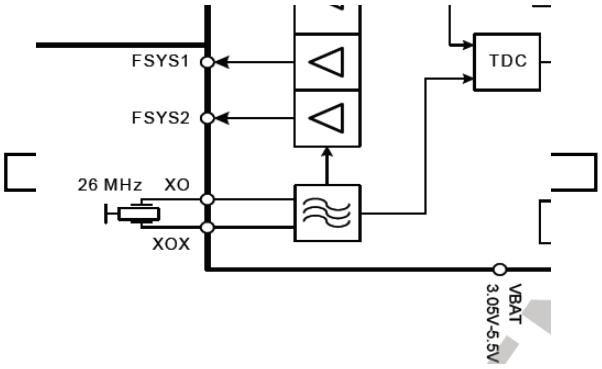


Figure. 3.4.1 Crystal Oscillator External Connection

The X-GOLDTM110 RF-Subsystem contains a fully integrated 26 MHz digitally controlled crystal oscillator, designed for 8 pF crystals. The only external part of the oscillator is the crystal itself. Overall pulling range of the DCXO is approximately ±55 ppm, controllable by a 13-bit tuning word DCXO_AFC[16:4].

The 26 MHz reference clock can also be applied to external components like Bluetooth or GPS, via the buffered output signal FSYS1.

3.5 RF Subsystem of PMB8810 (U101)

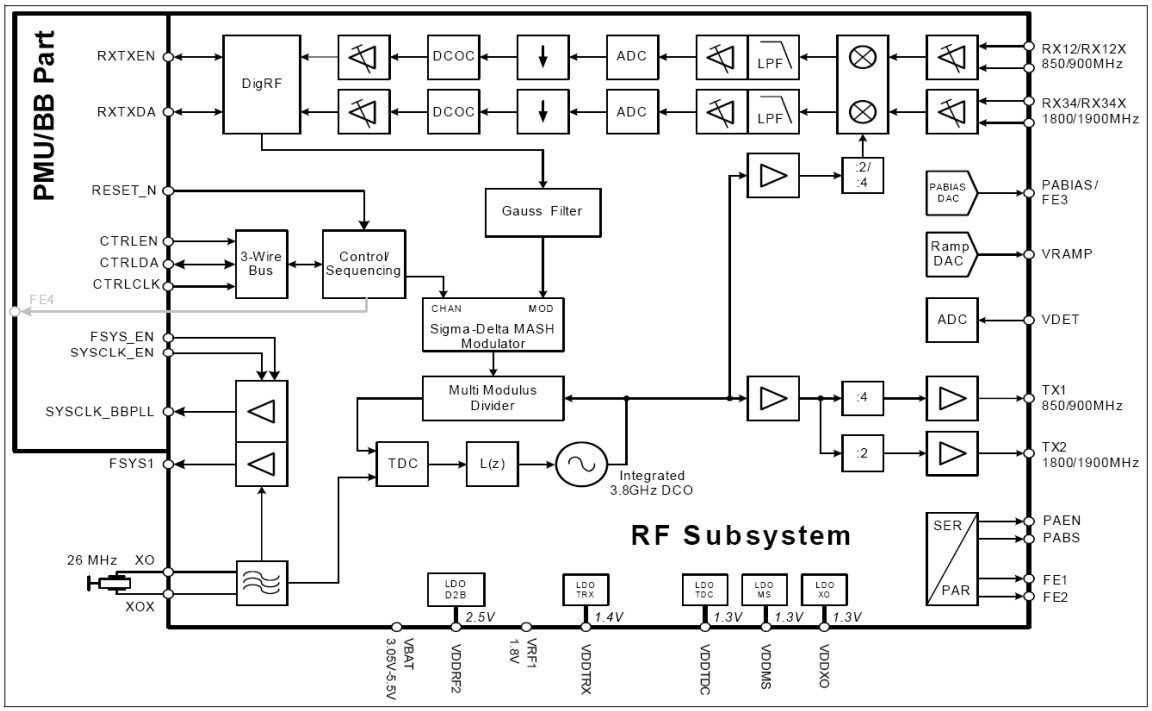


Figure. 3-5-1 Block DIAGRAM of RF Subsystem

3.5.1 GENERAL DESCRIPTION

The PMB8810 RF subsystem is designed for dual-band GSM voice and data applications (GPRS class 12). The system can be configured to support one low band, GSM850 or EGSM900, and one high band, DCS1800 or PCS1900. A block diagram of the RF subsystem is given in Figure 3-4-1.

3.5.2 FUNCTIONAL DESCRIPTION

3.5.2.1 Receiver

The X-GOLDTM110 receiver is based on the Direct Conversion Receiver architecture (DCR) and can be configured to support one low band, GSM850 or EGSM900, and one high band, DCS1800 or PCS1900. A fully differential receive path is chosen to suppress on-chip interference.
The analog section of the receiver contains two LNAs, quadrature mixer, low-pass filter, and a high resolution continuous-time delta-sigma analog-to-digital converter.

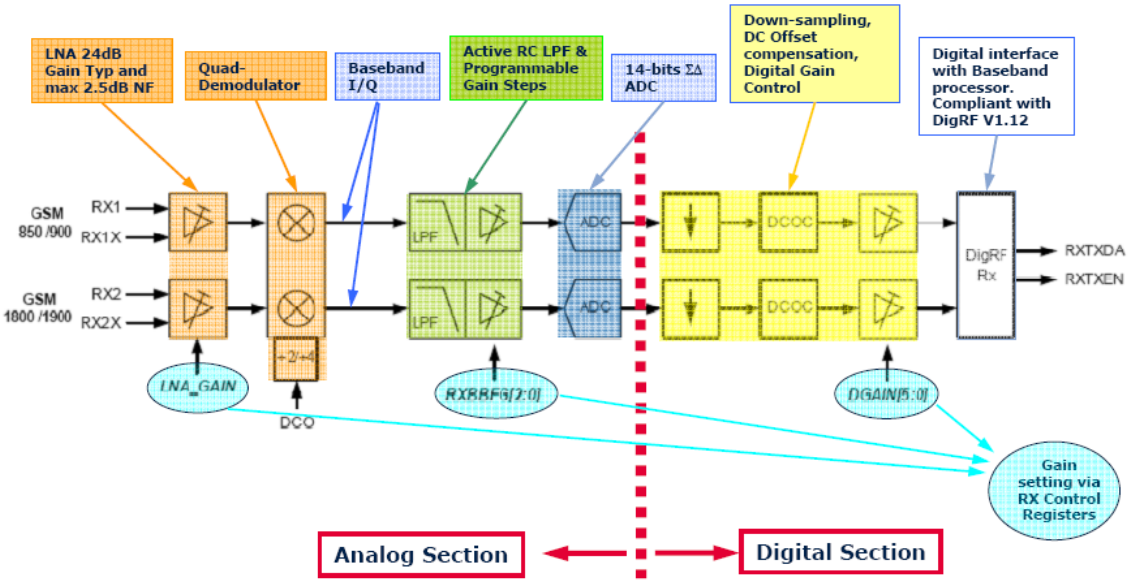


Figure. 3.5.2 RECEIVER CHAIN BLOCK DIAGRAM

3.5.2.2 Transmitter

The GMSK transmitter supports power class 4 for GSM850 or GSM900 as well as power class 1 for DCS1800 or PCS1900. The digital transmitter architecture is based on a fractional-N sigma-delta synthesizer for constant envelope GMSK modulation. This configuration allows a very low power design without any external components.
Up- and down-ramping is performed via the ramping DAC connected to VRAMP.

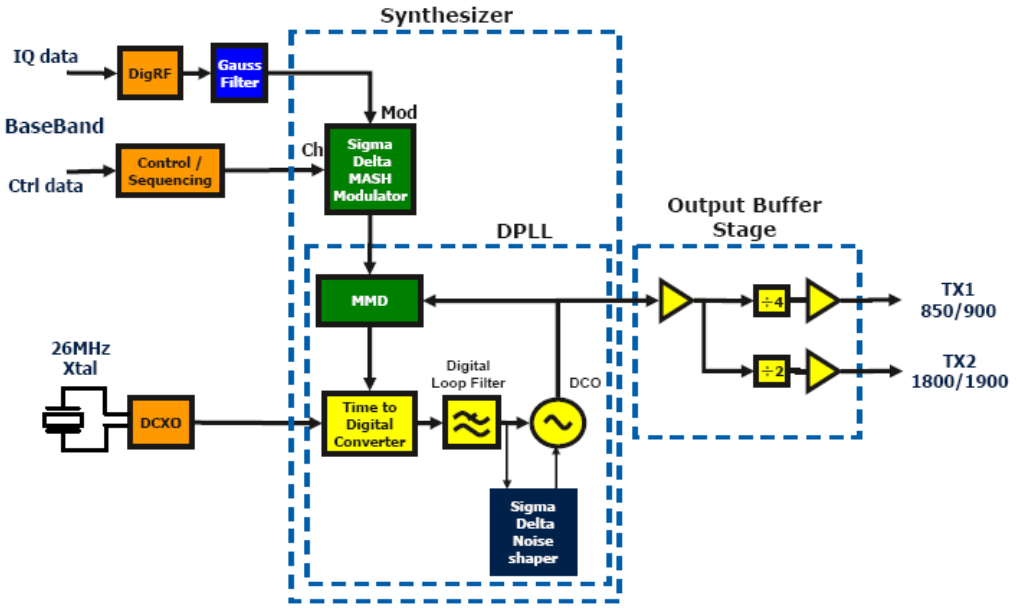


Figure. 3.5.3 TRANSMITTER CHAIN BLOCK DIAGRAM

3.5.2.3 RF synthesizer

The X-GOLDTM110 transceiver contains a fractional-N sigma-delta synthesizer for frequency synthesis in RX mode. In TX mode, the fractional-N sigma-delta synthesizer is used as a Sigma-delta modulation loop to process the phase/frequency signal. The 26 MHz reference signal is provided by the reference oscillator. This reference signal frequency serves as the comparison frequency for the phase detector and provides the digital circuitry with a clock signal.

3.5.2.4 Front-end/PA Control Interface

Two outputs (FE1, FE2) for direct control of antenna switch modules enable to select RX- and TX-mode as well as low- and high-band operation.
An extra band select signal PABS for the power amplifier is used, to support discrete PA and switching modules. Time accurate power dissipation of the PA is achieved by the control signal PAEN.
A minor set of power amplifiers require a bias voltage to enhance power efficiency. Support of this power amplifiers is achieved by the implemented bias DAC.

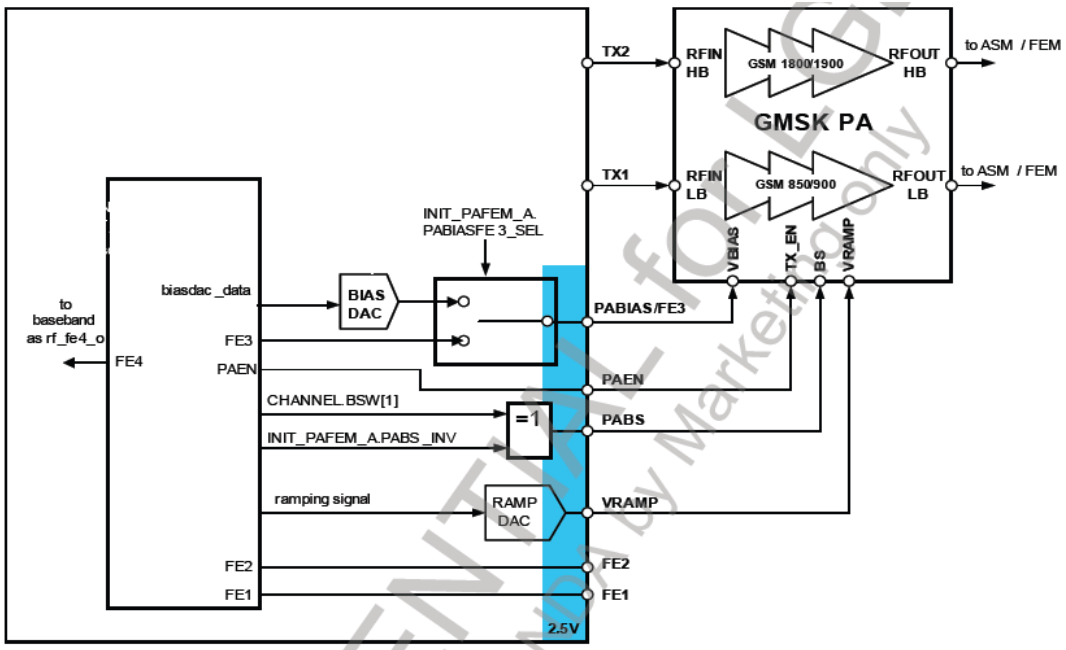


Figure. 3.5.4 PA AND FEM CONTROL BLOCK DIAGRAM

3.6 MEMORY(M36W0R5040U62S, U102)

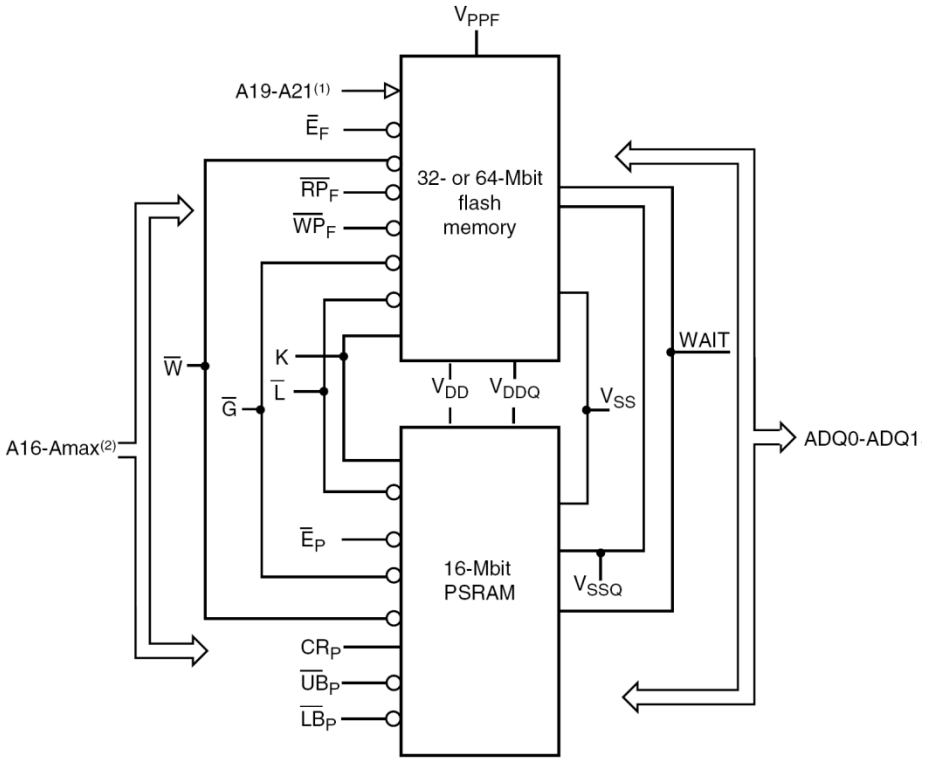


Figure. 3.6.1 MEMORY BLOCK DIAGRAM

The M36W0R5040U62S combine two memory devices in a multichip package:
- a 32-Mbit or 64-Mbit, multiple bank flash memory, the M58WR0xxKUL
- a 16-Mbit pseudo SRAM, the M69KM024A

Collectively, these four devices are referred to in this document as the M36W0Rx040x6.
The purpose of this document is to describe how the two memory components operate with respect to each other. It must be read in conjunction with the M58WR0xxKUL and M69KM024A datasheets, which detail all the specifications required to operate the flash memory and PSRAM components. These datasheets are available from your local Numonyx distributor.
The memory is offered in a stacked TFBGA52 (6 x 4 mm, 10 x 6 ball array, 0.50 mm pitch) package. Recommended operating conditions do not allow more than one memory to be active at the same time.

The PSRAM and flash memory components share the same power supplies and the same grounds. They are distinguished by two Chip Enable inputs: E_F for the flash memory and E_P for the PSRAM.
Recommended operating conditions do not allow more than one device to be active at a time, such as simultaneous read operations on the flash memory and the PSRAM component, which would result in a data bus contention.
Therefore, it is recommended to put the other device in the high impedance state when reading the selected device.

3.7 SIM Card Interface

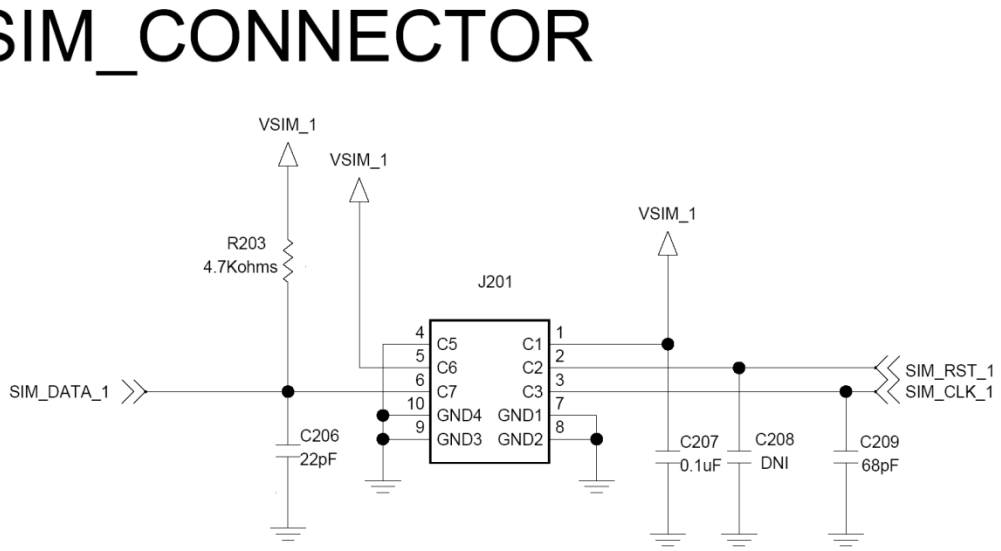


Figure 3.7.1. SIM CARD Interface

The Main Base Band Processor(XMM 110) provides SIM Interface Module.
The XMM2130 checks status Periodically During established call mode whether SIM card is inserted or not, but it doesn't check during deep sleep mode. In order to communicate with SIM card, 3 signals SIM_DATA, SIM_CLK, SIM_RST.
And This model supports 1.8/3V SIM Card.

Signal	Description
SIM_RST	This signal makes SIM card to HW default status.
SIM_CLK	This signal is transferred to SIM card.
SIM_DATA	This signal is interface datum.

3.8 LCD Interface

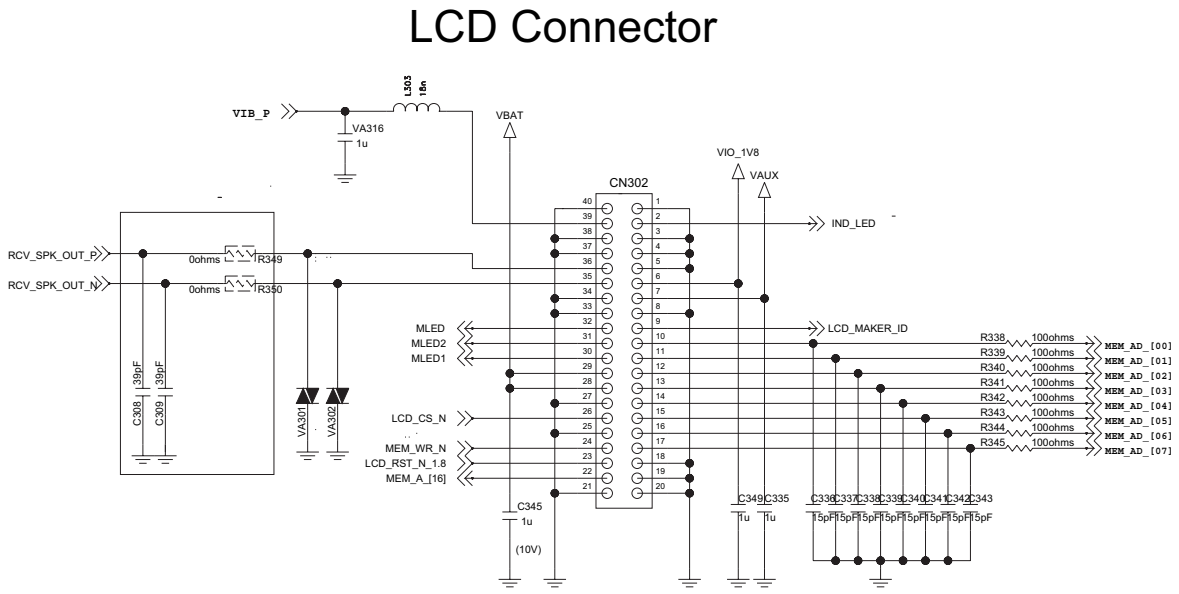


Figure 3.8.1. LCD Interface

ILI9163C is a 262,144-color one-chip SoC driver for a-TFT liquid crystal display with esolution of 132RGBx162 dots, comprising a 396-channel source driver, a 162-channel gate driver, 8,114bytes GRAM for graphic data of 132RGBx162 dots, and power supply circuit. The ILI9163C supports 18-/16-/9-/8-bit data bus interface and serial peripheral interfaces (SPI). It lso supplies 18-bit, 16-bit or 6-bit RGB interface for driving video signal directly from application controller. The moving picture area can be specified in internal GRAM by window address function. The specified window area can be updated selectively, so that moving picture can be displayed simultaneously independent of still picture area.

ILI9163C can operate with 1.65V I/O interface voltage, and an incorporated voltage follower circuit to generate voltage levels for driving an LCD. The ILI9163C also supports a function to display in 8 colors and a sleep mode, allowing for precise power control by software and these features make the ILI9163C an ideal LCD driver for medium or small size portable products such as digital cellular phones, smart phone, MP3 and PMP where long battery life is a major concern.

2CH LED DRIVER

(for LCD)

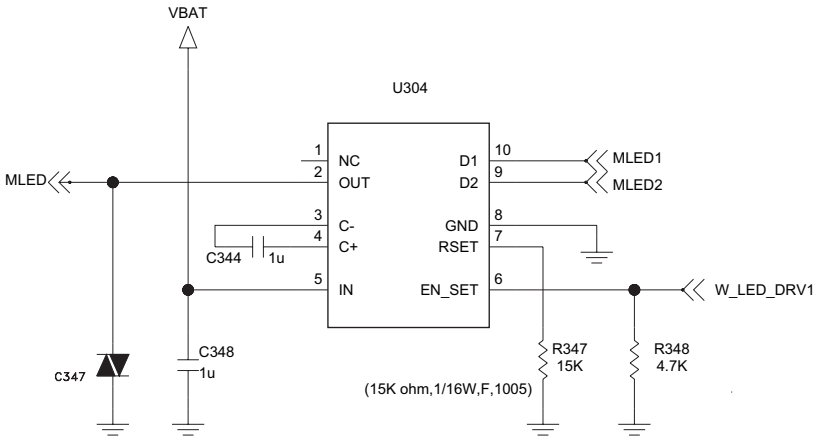


Figure 3.8.2. AAT3192 CIRCUIT DIAGRAM

The AAT3192 is a charge-pump based, current-sink white LED driver capable of driving one or two LEDs up to 30mA, each. It automatically switches between 1x mode and 2x mode to maintain the highest efficiency and optimal LED current accuracy and matching. The AAT3192 charge pump's 1x mode (bypass mode) has very low resistance allowing LED current regulation to be maintained with input supply voltage approaching the LED forward voltage. The AAT3192 is available in the 2x2mm, 10-lead SC70JW-10 package.

- Drives up to 2 LEDs at up to 30mA, each
- Automatic Switching Between 1x and 2x Modes
- 0.9MHz Switching Frequency
- Linear LED Output Current Control
- Single-wire, S2Cwire Interface
- AAT3192-1: 16-step
- ±10% LED Output Current Accuracy
- ±3% LED Output Current Matching
- Low-Current Shutdown Mode
- Built-in Thermal Protection

3.9 Battery Charger Interface

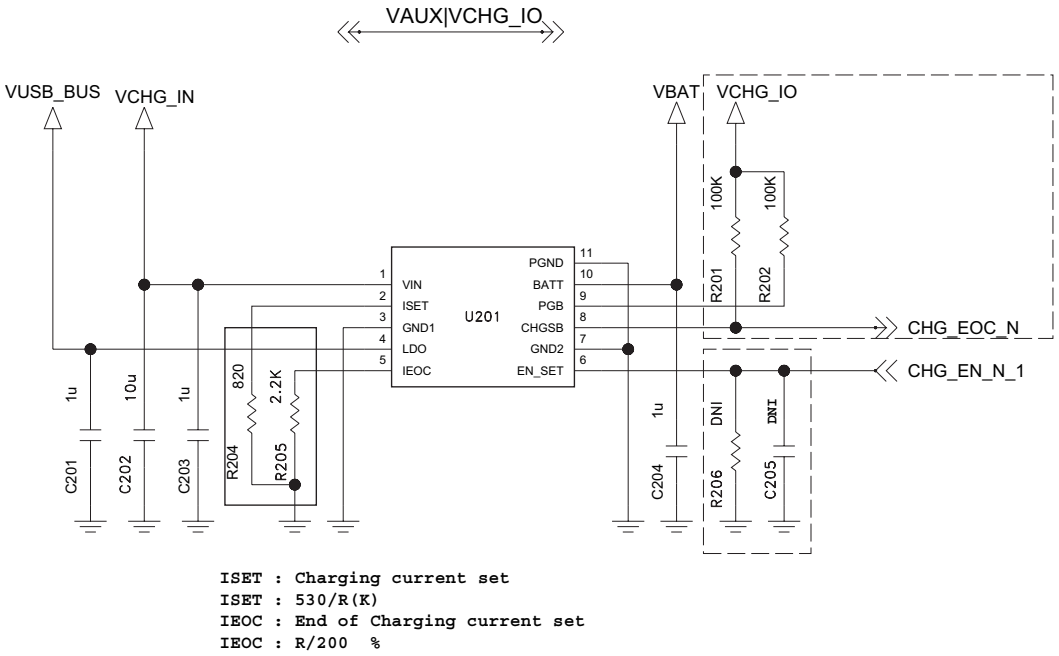


Figure 3.9.1 BATTERY CHARGER BLOCK

The RT9524 is a fully integrated single-cell Li-Ion battery charger ideal for portable applications. The RT9524 optimizes the charging task by using a control algorithm including pre-charge mode, fast charge mode and constant voltage mode. The input voltage range of
VIN pin can as high as 30V. When the input voltage exceeds the OVP threshold, it will turn off the charging MOS to avoid overheating of the chip.
In RT9524, the maximum charging current can be programmed with an external resister. For the USB application, user can set the current to 100mA/500mA through EN/SET pin. For the production testing mode, RT9524 can allow 4.2V/2.3A power pass through to support system operation. It also provide a 50mA LDO to support the power of peripheral circuit. The internal thermal feedback circuitry regulates the die temperature to optimize the charge rate for all ambient temperatures.
The other features are under voltage protection, over voltage protection for VIN supply and thermal protection of battery temperature.

3.10 Keypad Interface

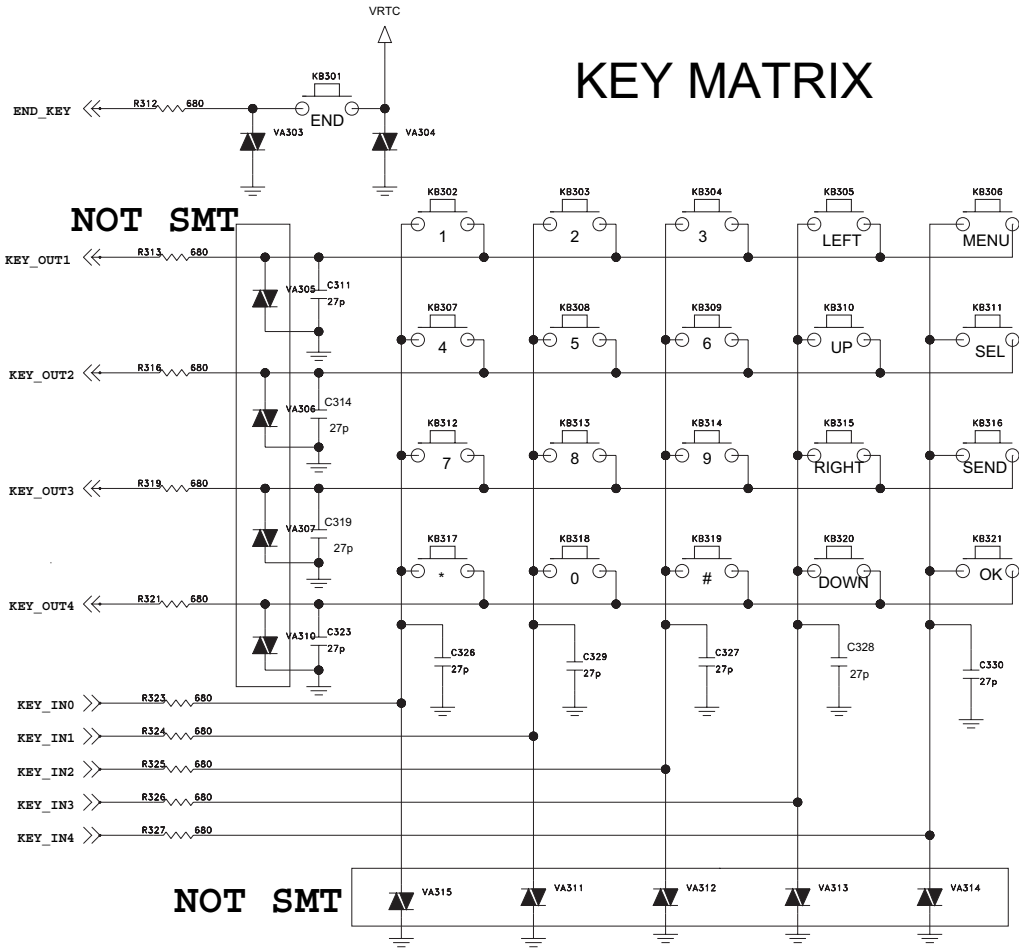


Figure 3.10.1 MAIN KEY STRUCTURE

The Keypad Interface is a peripheral controller, which can be used for scanning external keypad matrices with up to 8 rows and 8 columns (that is 64 standard keys). By adding an additional row of keys connected to ground the number of keys can be extended by up to 8 keys. This results in a maximum number of 72 keys to by identified by the Keypad Interface Controller.
The Keypad Scan Module reduces the number of interrupts and polling through the processor and therefore reduces the power consumption. The module is able to debounce and scan the external keypad matrix automatically without any software intervention. After debouncing it generates an interrupt. The interface controller contains information about the key (or key combination) that was pressed and how long it was pressed.

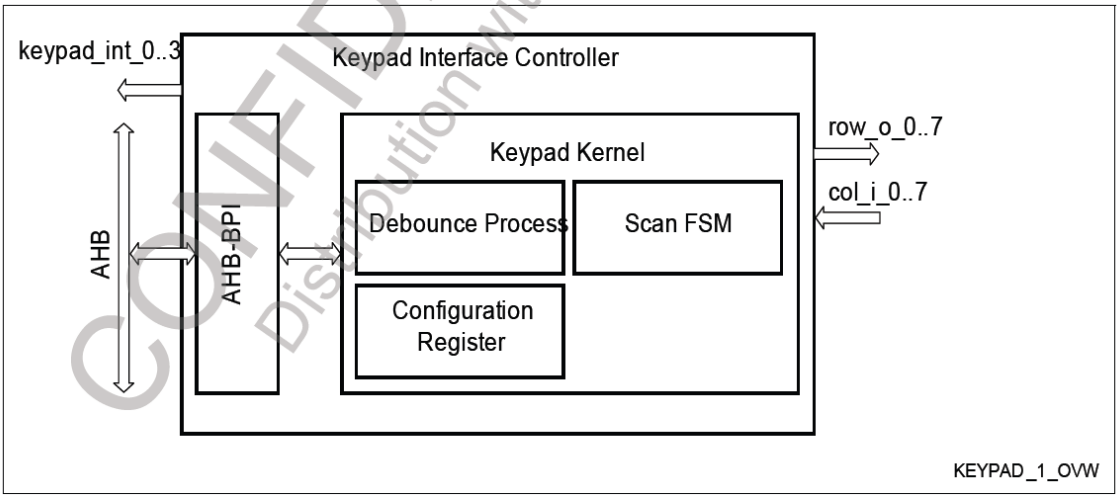


Figure 3.10.2 Block Diagram and System Integration of the KPD

3.11 Audio Front-End

3.11.1 Functional Overview

The audio front-end of X-GOLD™ 110 offers the digital and analog circuit blocks for both receive and transmit audio operation, from a mobile phone perspective (called audio-in and audio-out subsequently). It features a high-quality, stereo digital-to-analog path with amplifier stages for connecting acoustic transducers to X-GOLD™ 110. In audio-in path the supply voltage generation for electret microphones, a low-noise amplifier and analog to digital conversion are integrated in X-GOLD™ 110. A more detailed functional description will be given in the following sections.

The audio front-end itself can be considered to be organized in three sub-blocks:
• Interface to processor cores (TEAKLite® and - indirectly - ARM)
• Digital filters
• Analog part

The following figure shows an architecture overview of the Audio section.

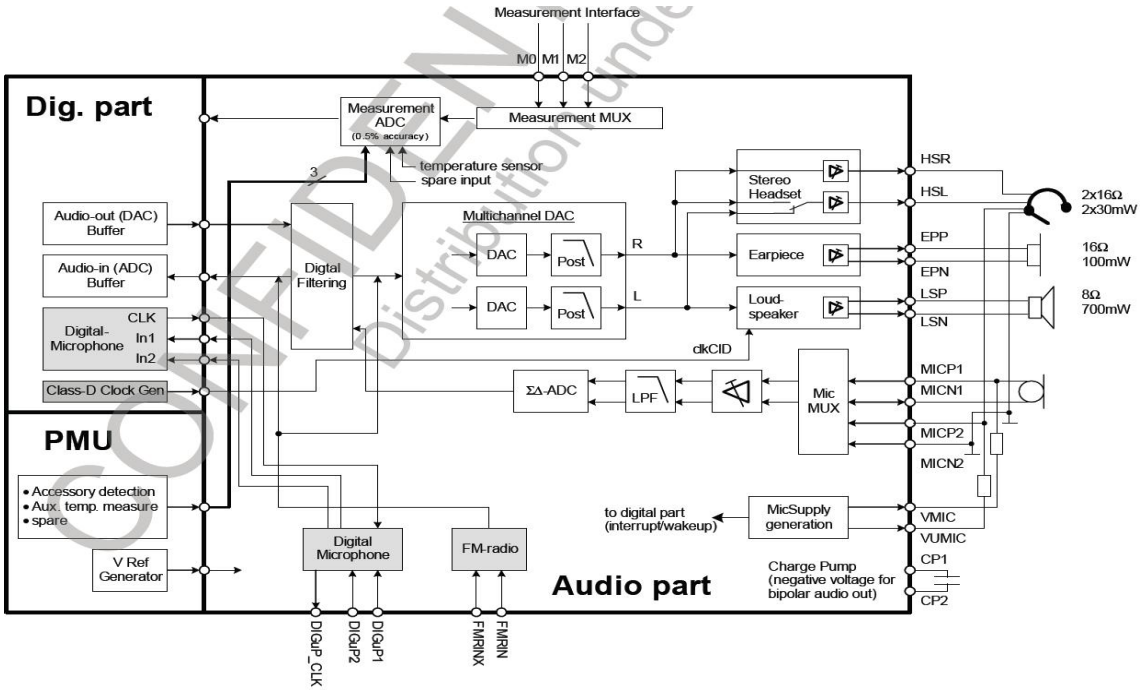


Figure 3.11.1 Audio Section Overview

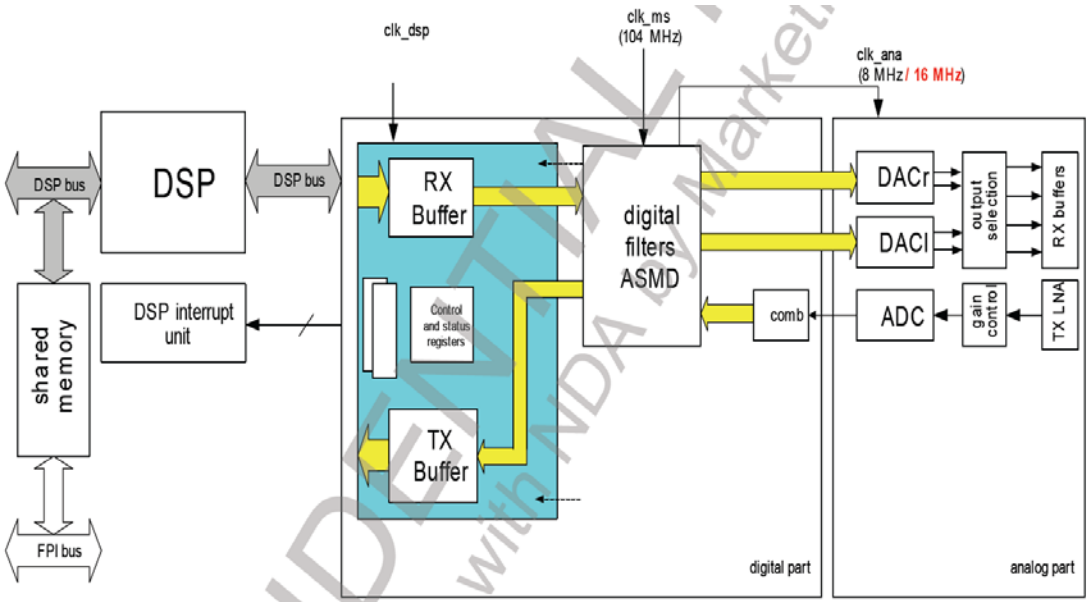


Figure 3.11.2 Overview of Clocking and Interfaces of Audio Front End

The audio front-end of X-GOLDTM110 has the following major operation modes:

- Power-down: All analog parts are in power down and all clocks of the digital part are switched off.
- Audio mode: Digital decimation/interpolation filters are connected to the interface buffers and the analog part is enabled.

These major modes can be modified by certain control register settings.

- Due to the new gain settings in the TX path, the maximum input voltage is limited to 0.8 Vpp.
- In both voiceband paths, the value range for voice samples is confined to 97.5%, i.e. to [-31948, 31947] or [8334H, 7CCBH] in X-GOLDTM110 .
- On the TX path, 83% "1"s on the VTPDM line correspond to a 16-bit value of 7CCBH and 17% "1"s correspond to a 16-bit value of 8334H at the digital filter output. Thus the usable range is 66%. This range can be scaled to 100% by Firmware.
- The high-pass functions of the voiceband filters have to be implemented in firmware on TEAKLite®.

3.11.2 Digital Part

The digital part of the X-GOLDTM110 audio front-end comprises an interface to the TEAKLite® bus, interfaces to the interrupt units of TEAKLite®, digital interpolation filters for oversampling digital-to-analog conversion, digital decimation filters for analog-to-digital conversion and an interface to the analog part of the audio front-end.
For the digital microphone all the filtering is done in a dedicated hardware. The output sample stream is then fed in a duplicated ring buffer structure like the data from the analog microphone path (after A/D conversion and subsequent digital filtering).

▪ Interpolation Filter
The interpolation path of the X-GOLD™110 audio front-end increases the sampling rate of the audio samples to the rate of the digital-to-analog converter. Because the input sampling rates can vary between 8 kHz and 47.619 kHz the filter characteristic and oversampling ratio can be adjusted to the respective sampling rate. The requirements for the interpolation filters depend on the sampling rate, because a sufficient out-of-band discrimination in the audio frequency band (20 Hz,...,20 kHz) has to be ensured.

▪ Decimation Filter
The digital decimation filter on X-GOLD™110 has two operating modes: 8 kHz output sampling rate and 16 kHz output sampling rate (or 16 kHz output sample rate and 16kHz bandwidth in case of doubled ASMD clock).

3.11.3 Analog Part

The analog part of the X-GOLD™110 audio front-end in audio-out direction consists of a stereo digital to analog converter (multi-bit oversampling converter) which transforms the output of the digital interpolation filter into analog signals. It is followed by the gain control/amplifier section. The DAC outputs can be switched to several output buffers. In audio-in section there is an input multiplexer which selects either one of two differential microphone inputs to be connected to the low-noise amplifier and analog pre-filter. The signals from the analog pre-filter are input to a second-order sigma-delta analog-to-digital converter. In addition there is a connection for FM-radio playing.

▪ Audio-out Part
The analog audio-out part consists of two multi-bit digital-to-analogue converters (DAC) and an output stage. The signal sources are switched to the output drivers in the output stage. The output drivers consist of: a) one mono, differential class-D Loudspeaker driver, b) one mono, differential Earpiece driver and c) one stereo, single-ended (with uni- or bipolar signals), Headset driver.

▪ **Digital-to-analog converters**

The multi-bit oversampling DACs of the X-GOLD™110 audio front-end convert the 16-bit data words coming from the digital interpolation filters to analogue signals.

▪ **Output Amplifier**

The different output buffers in X-GOLD™110 are driven by the outputs of the selection block. The differential earpiece driver can be used to drive a 16 Ω earpiece and works in differential. The two single ended headset drivers can be used to drive a 16 Ω headset. They can work unipolar mode, where an AC coupling of the headset might be needed, or can work also in bipolor mode. The differential loudspeaker driver can be used to drive a 8 Ω loudspeaker. As it is a class-D amplifier the needed suppression of the higher harmonics of the switching signals
has to be achieved by the external circuitry. The buffers are designed to be short circuit protected.

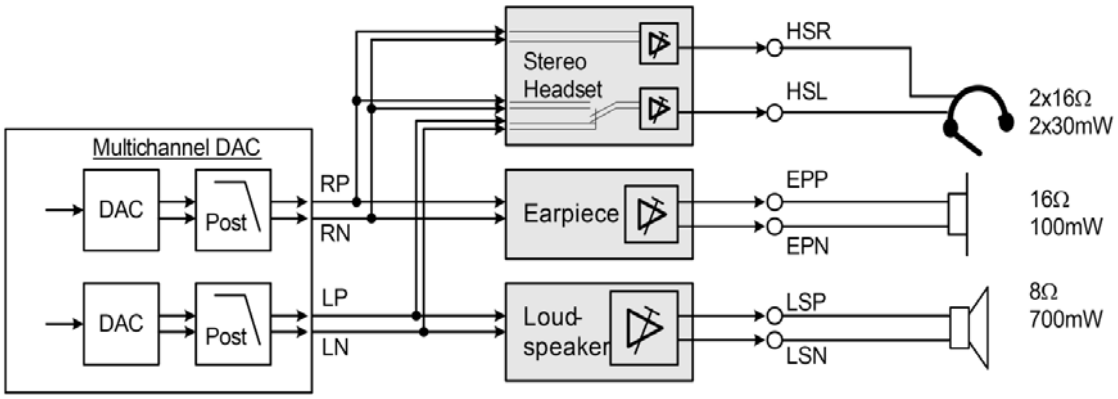


Figure 3.11.3 Switching for R/L DACs onto Buffers

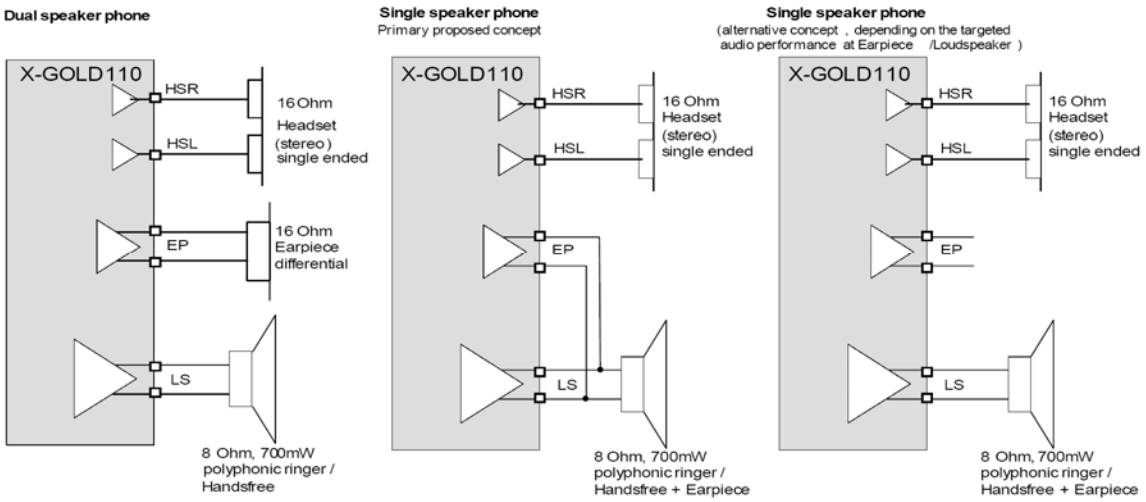


Figure 3.11.4 Different Application Scenarios

In order to achieve the single-speaker concept by parallel connection of Earpiece and Headset amplifier the Earpiece amplifier have to sustain the up to 5 V voltage of the class-D amplifier.

▪ Audio-in Path

The audio-in path of X-GOLD™110 provides two differential microphone input sources, MIC1and MIC2.

• The inputs for microphone MIC1 are MICP1 and MICN1.
• The inputs for microphone MIC2 are MICP2 and MICN2.

The audio-in path consists of an input selector, a low noise amplifier and following pre-filter with gain control, a second order ΣΔ-converter and a digital decimation filter. It supports both standard GSM (bandwidth 3.5 kHz) and wideband (bandwidth 7 kHz) speech bands.
The differential input signal from the microphone first passes a low noise amplifier and following pre-filter and an anti-aliasing pre-filtering stage achieving and overall variable gain ranging from 0 dB to +39 dB . The signal is then modulated by a second order ΣΔ-converter which is clocked with the same clock rate as the digital to analog converters. The ΣΔ-converter delivers a 1-bit pulse density modulated data stream at a rate of 2 MHz to the digital decimation filter which reduces the rate to 8 kHz or 16 kHz, depending on the current mode.
To improve SNR the sample frequency can be doubled in dedicated modes and the modulated data stream is 4MHz instead of 2 MHz.

▪ Microphone Supply

X-GOLD™213 has a single ended power-supply concept for electret microphones:
For both modes a minimal load capacitance of t.b.d. nF is necessary to guarantee stable operation of the buffer.
The maximal load capacitance must not exceed t.b.d. nF.
2 microphone supplies VMIC and VUMIC are available. The supply VUMIC has a ultra-low-power mode, where the current consumption is minimum, whilst at the same time the noise performance is reduced. For this purpose the VUMIC is directly supplied out of the VMIC regulator, the Mic-Buffer can be switched off and only the quiescent current of the VMIC regulator is present. This mode can be used to supply a headset and allow accessory detection with highly reduced current consumption For normal operation the supply can be switched to normal operation mode with improved noise performance. In case of an digital microphone VMIC can be used for supplying this microphone.

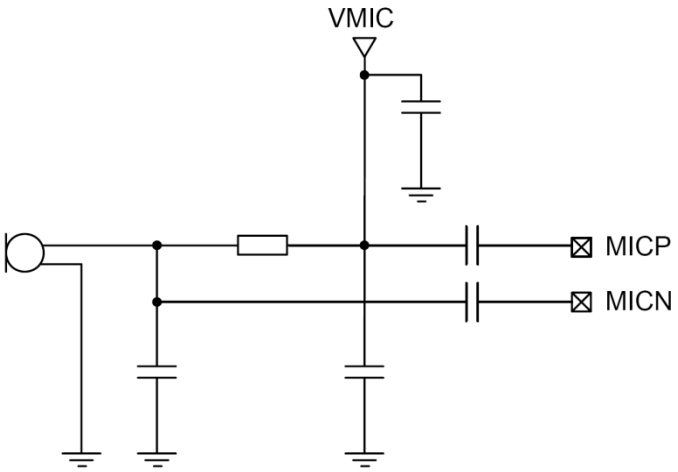


Figure 3.11.5 Typical Microphone Supply Generation (alternative)

3.12 KEY BACLKLIGHT LED Interface

Key Backlight LED is controlled by switch (Q301). If KEY_BCKLIGHT is high, Current is flowing from VBAT to LED. Then Light emitted from The LED.

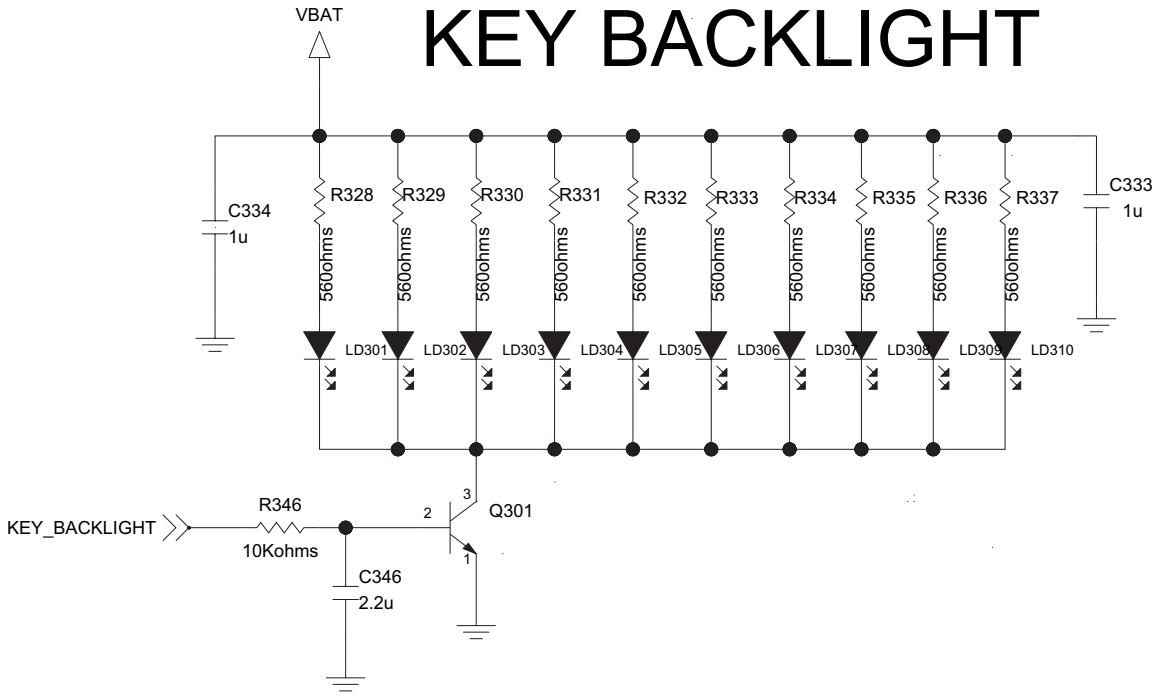


Figure 3.12.1 Key Backlight Block

3.13 Vibrator Interface

Support PWM signal which generated by hardware itself via register control
Direct connect to the VIB and VSSVIB pin from XMM110 without any external component required
It is capable to driver the vibrator motor up to 150mA

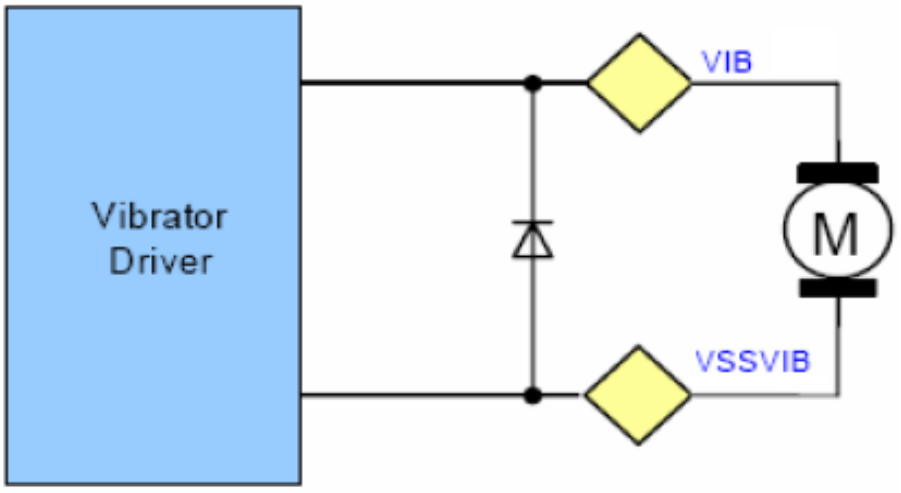


Figure 3.13.1 Vibrator Driver Block Diagram

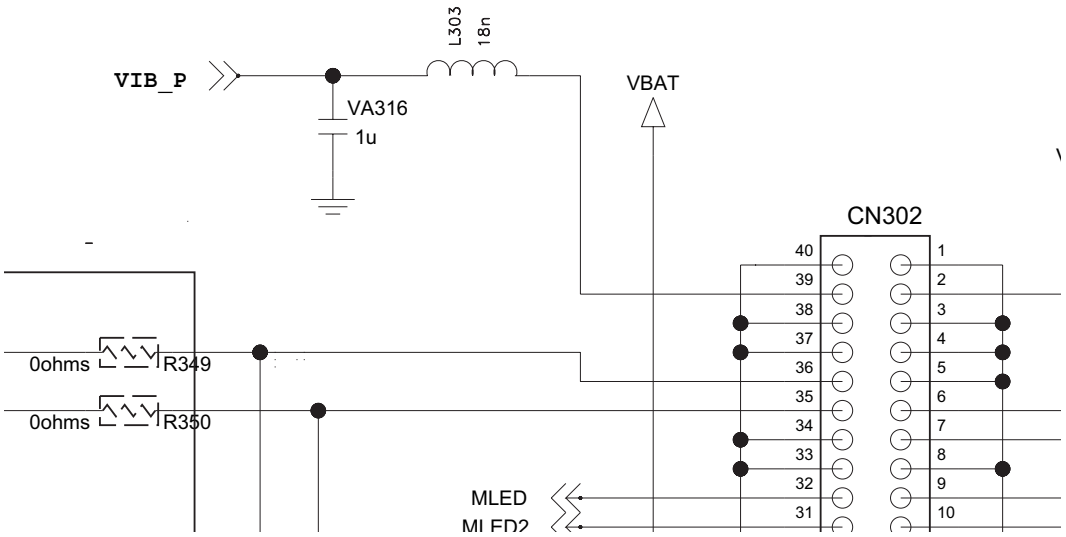


Figure 3.13.2 Vibrator Driver Block

3.14 HALL IC

Hall sensor respond to the magnetic field. If it is used for mobile phones, It is used for opening of the slide.
A little magnet attached to the slide. If slide is opened, Hall sensor is ON.
Therefore, to see whether the opening of the slide.

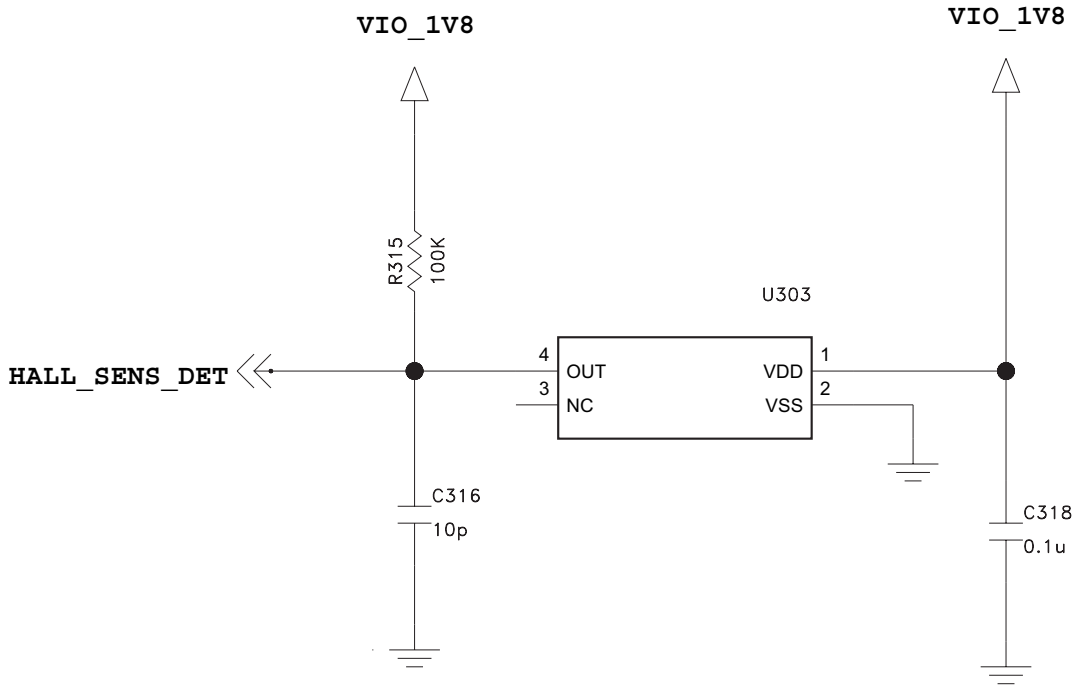


Figure 3.14.1 Hall Sensor block

4. TROUBLE SHOOTING

4.1 RF Component

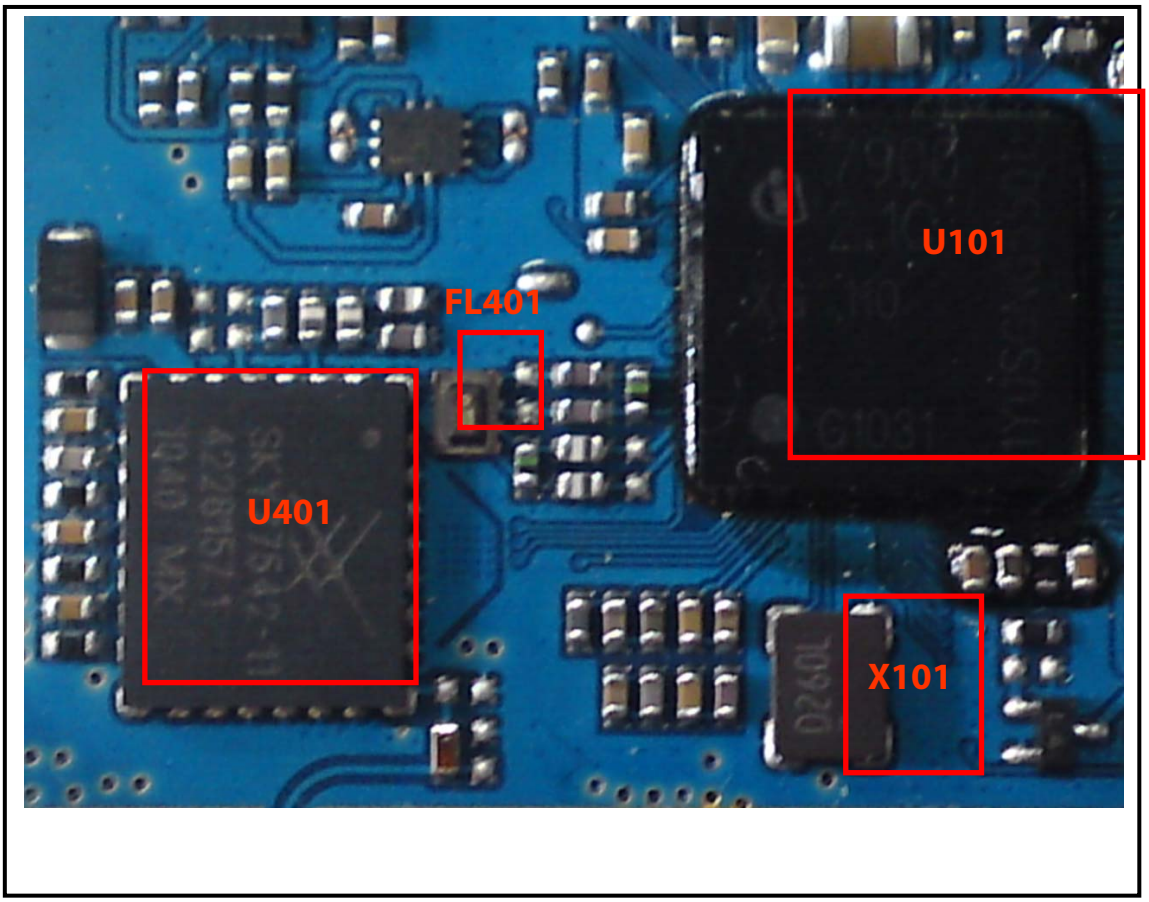
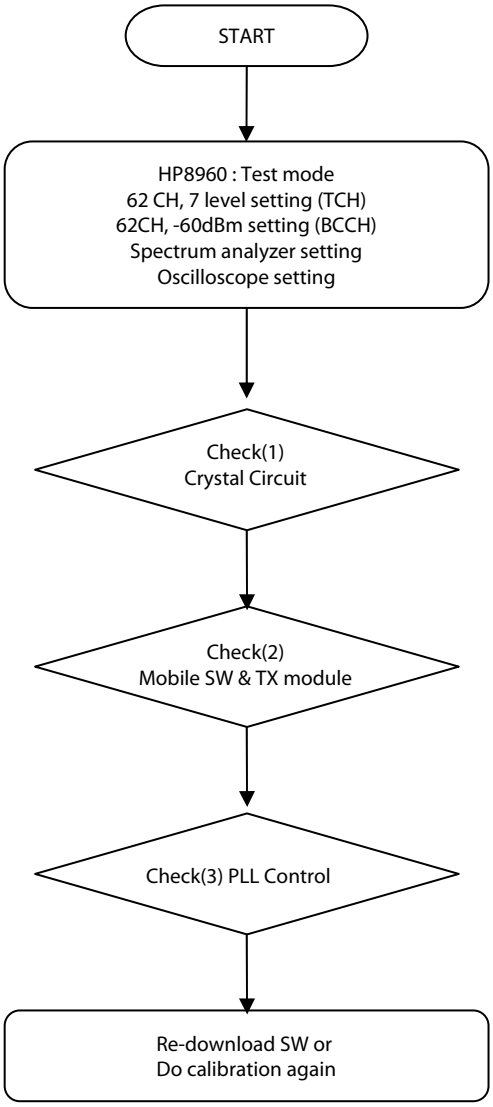


Figure 4.1

U101	Main Chip (EGV3)
U401	Tx Module
FL401	SAW Filter
X101	Crystal, 26MHz Clock

4.2 RX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

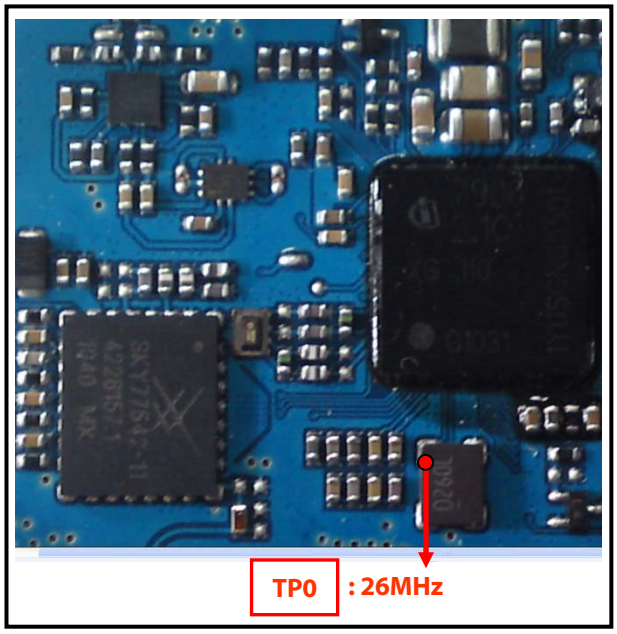
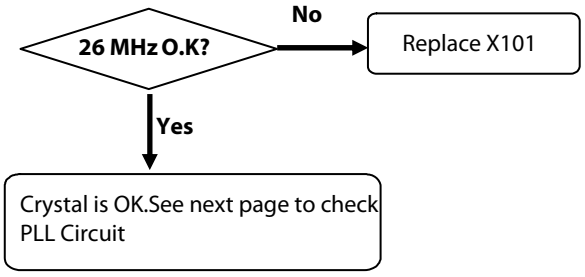


Figure 4.2.1

CHECKING FLOW



CIRCUIT

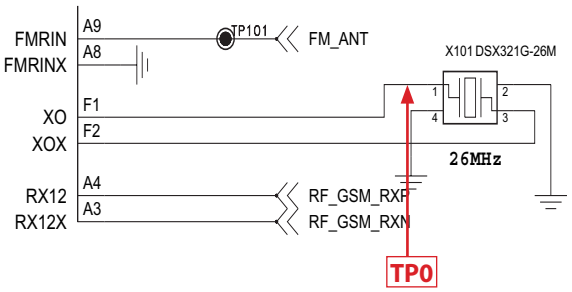


Figure 4.2.2

WAVEFORM

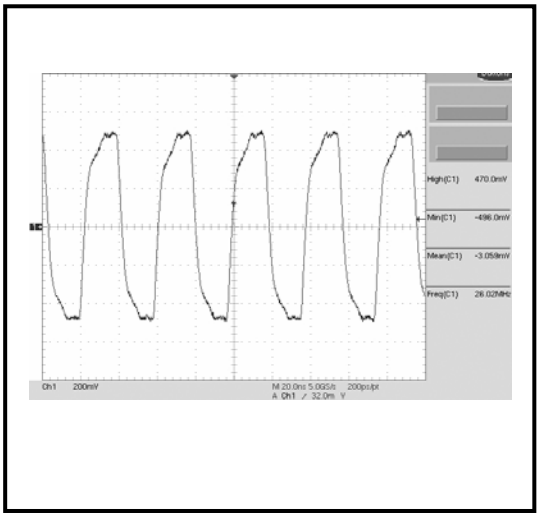


Figure 4.2.3

(2) Checking Mobile SW &FEM

TEST POINT

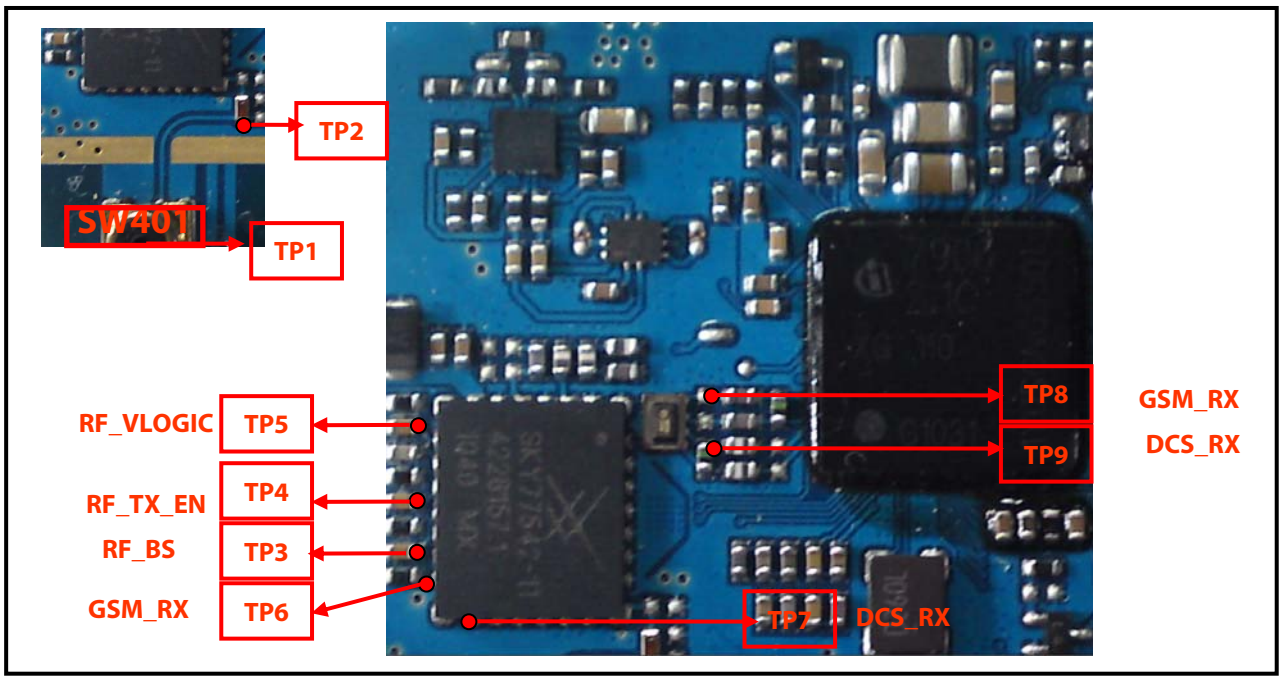
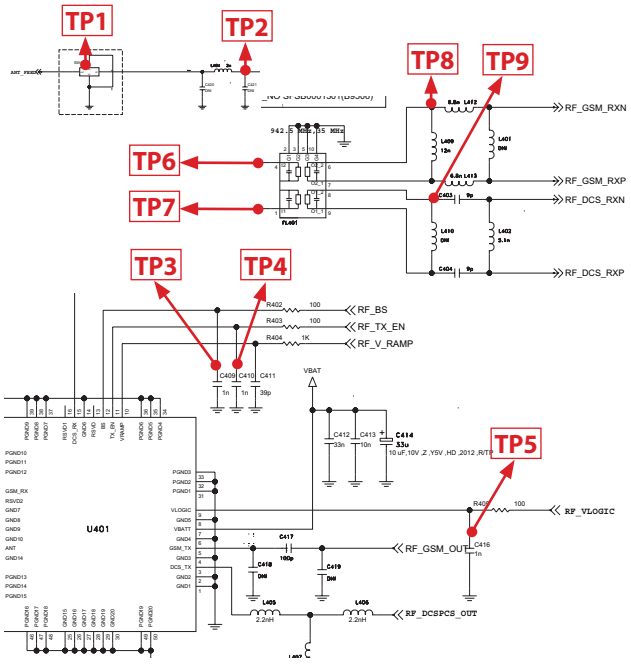
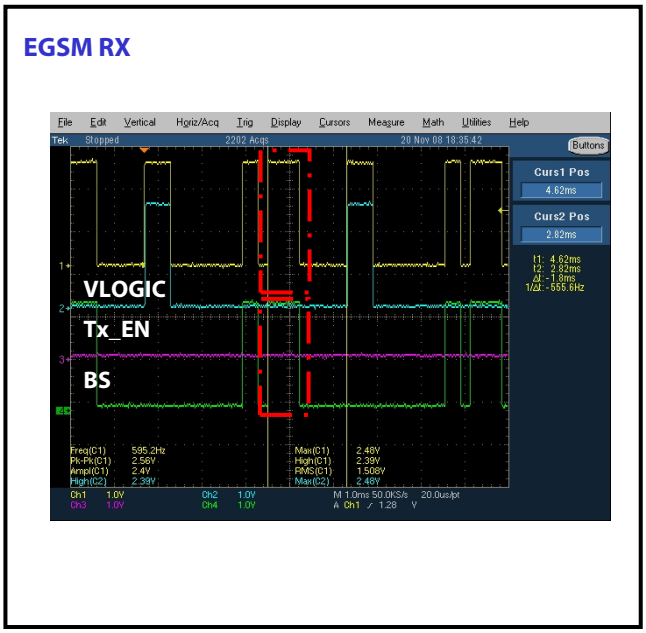


Figure 4.2.4

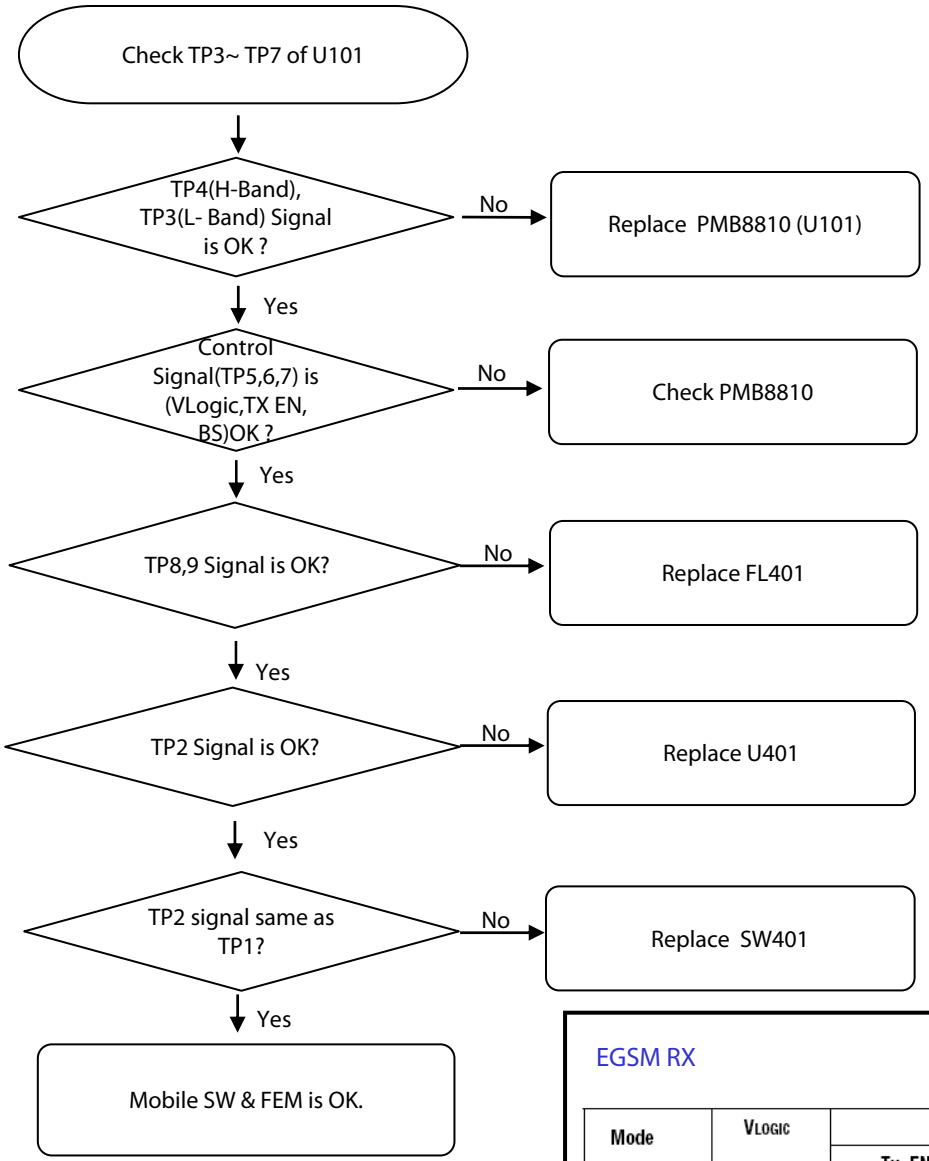
CIRCUIT



CONTROL LOGIC



CHECKING FLOW



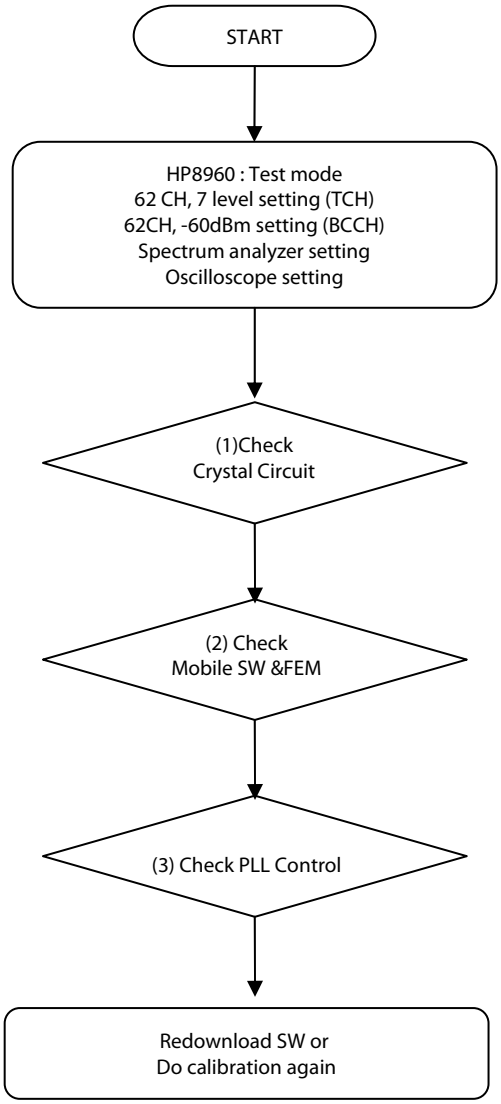
EGSM RX

Mode	VLOGIC	Input Control Bits	
		Tx_EN	BS
STANDBY	0	X [1]	X [1]
GSM_Rx	1	0	0
DCS_Rx	1	0	1
GSM_Tx	1	1	0
DCS_Tx	1	1	1

[1] X = don't care

4.3 TX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

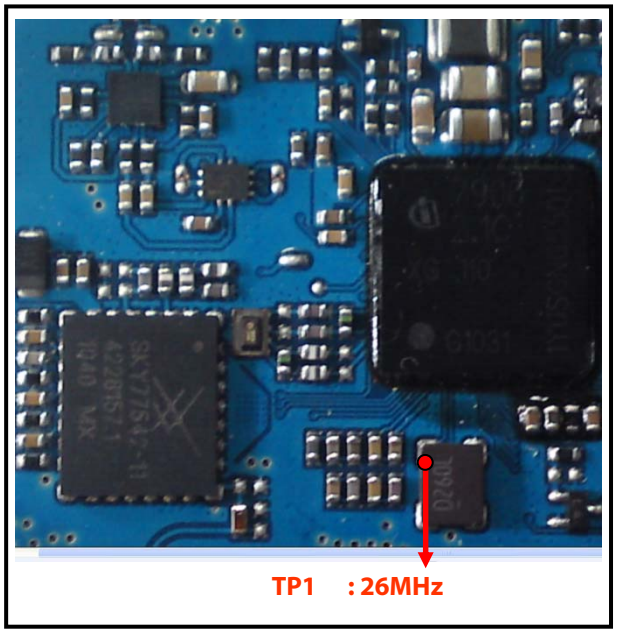
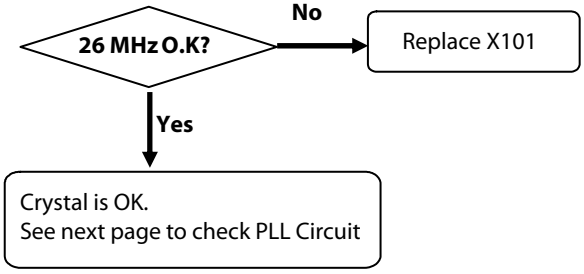


Figure 4.3.1

CHECKING FLOW



CIRCUIT

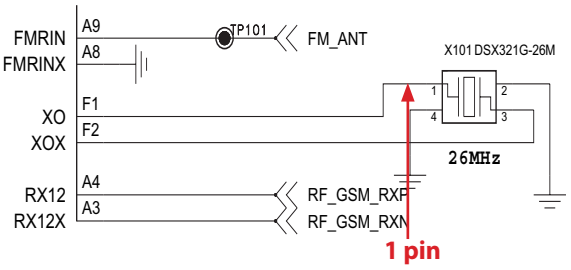


Figure 4.3.2

WAVEFORM

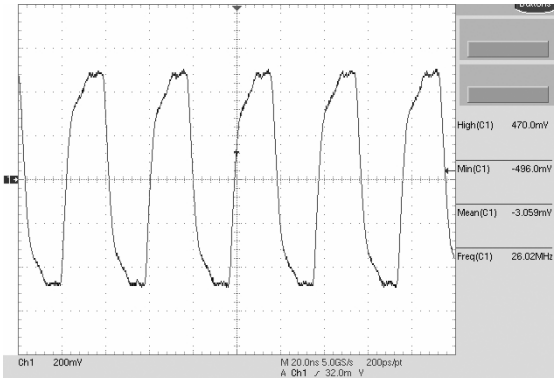


Figure 4.3.3

(2) Checking Mobile SW &FEM

TEST POINT

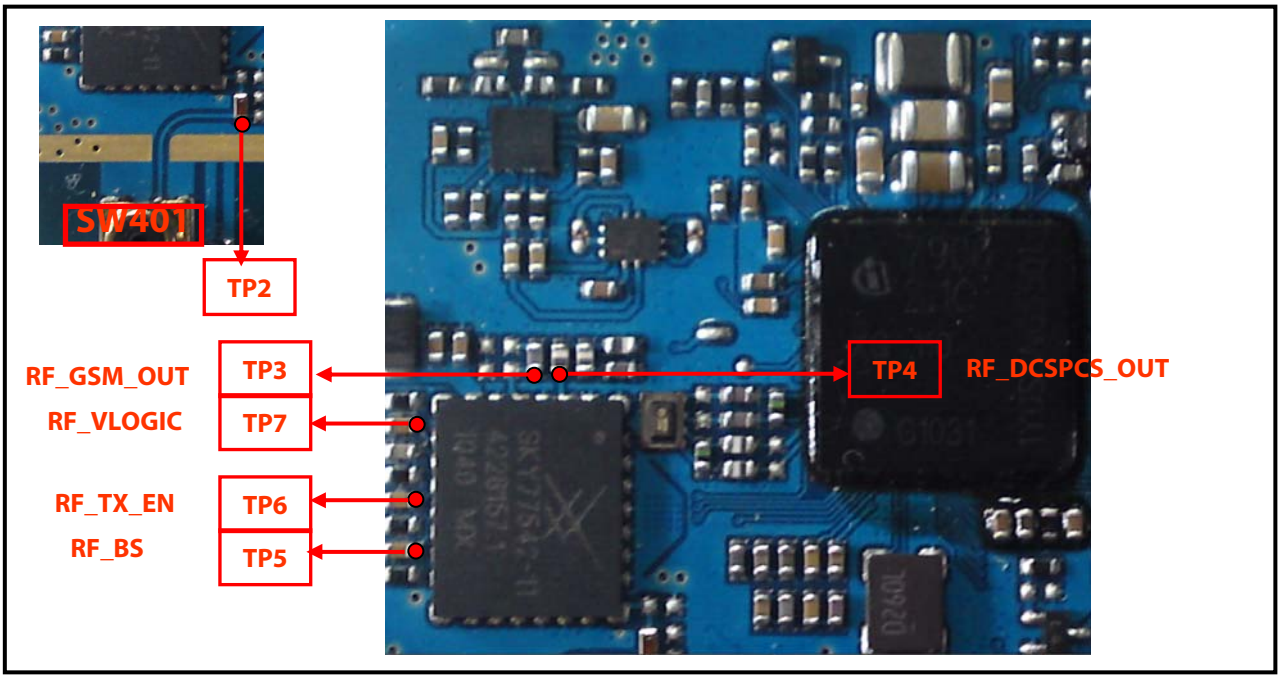
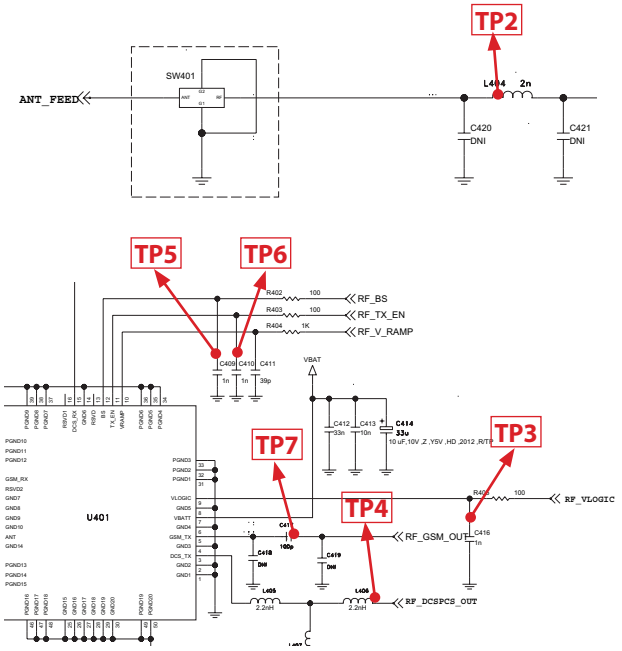
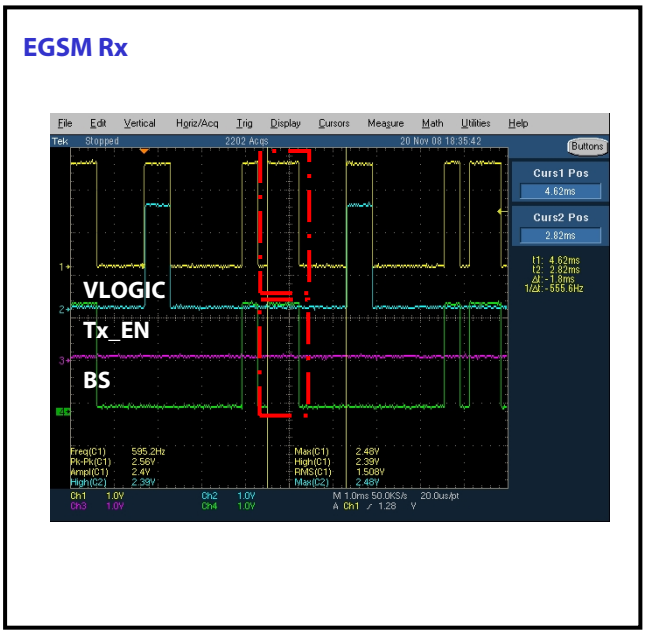


Figure 4.2.4

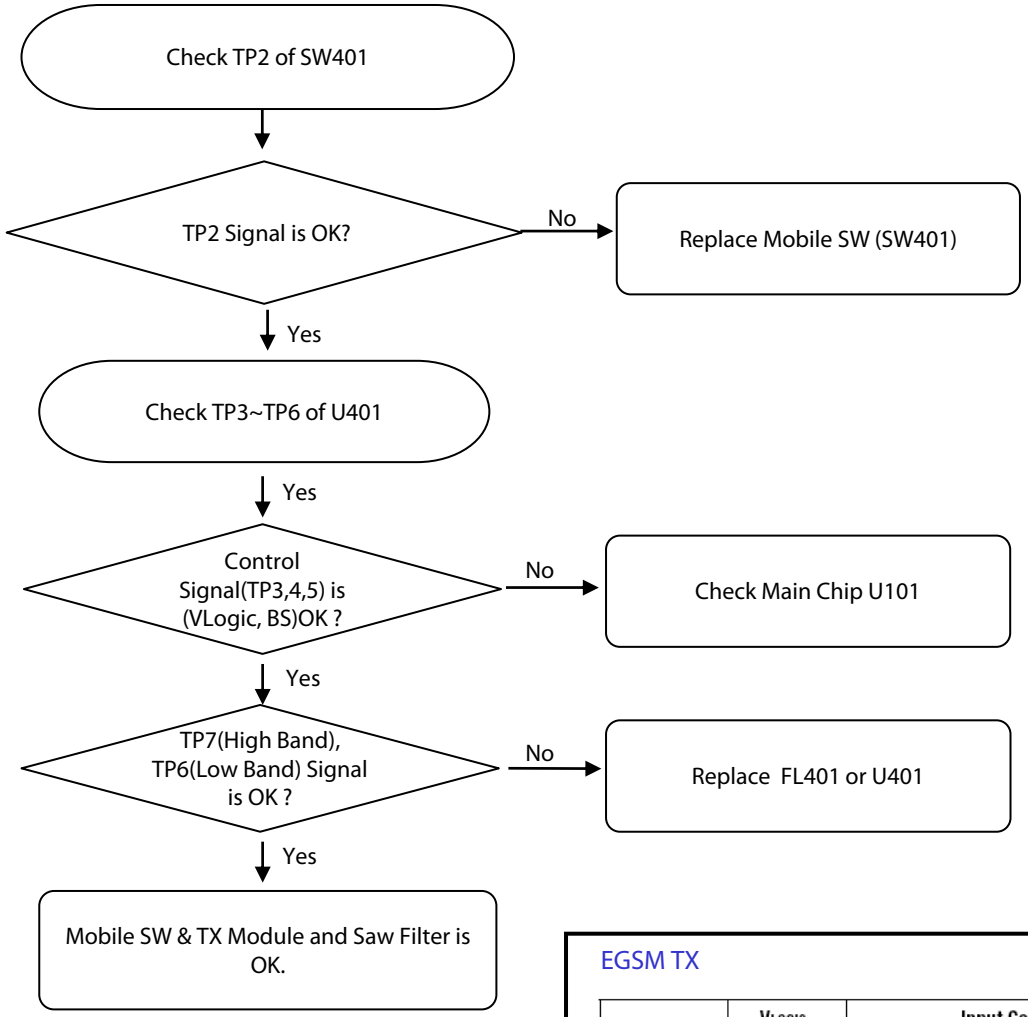
CIRCUIT



CONTROL LOGIC



CHECKING FLOW



EGSM TX

Mode	VLOGIC	Input Control Bits	
		Tx_EN	BS
STANDBY	0	X [1]	X [1]
GSM_Rx	1	0	0
DCS_Rx	1	0	1
GSM_Tx	1	1	0
DCS_Tx	1	1	1

[1] X = don't care

4.4 Power On Trouble

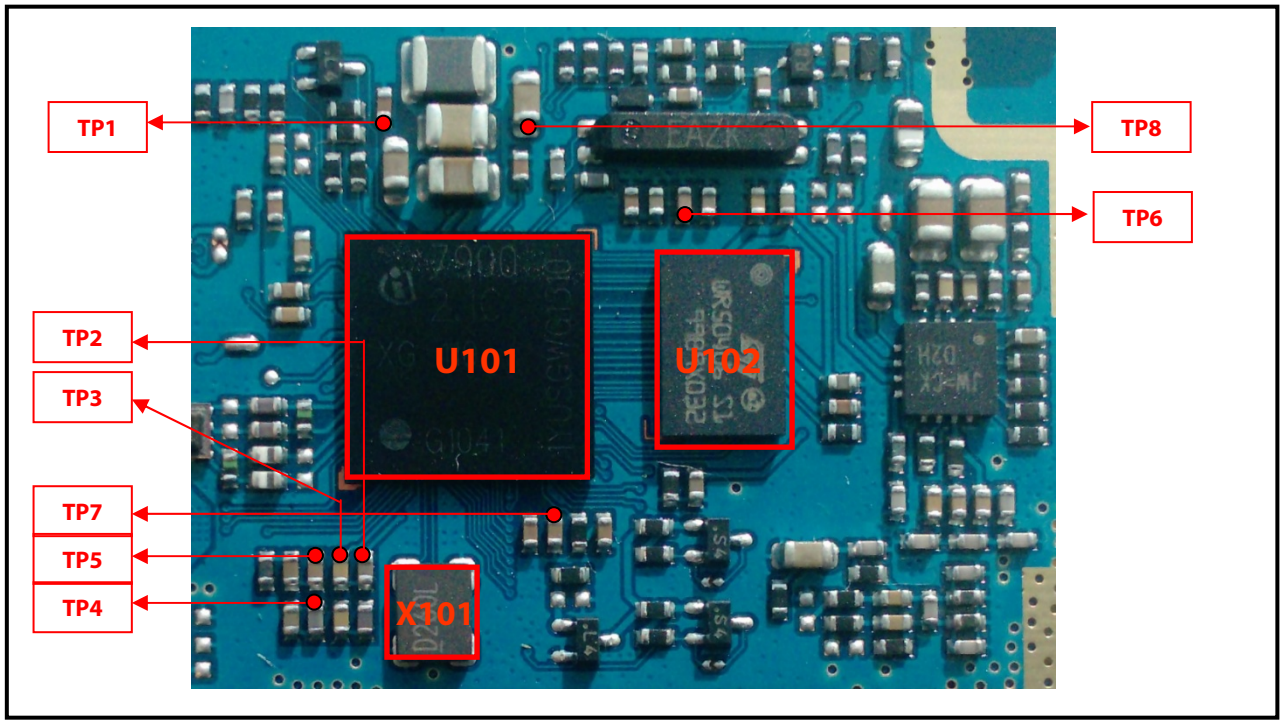


Figure 4.4.1

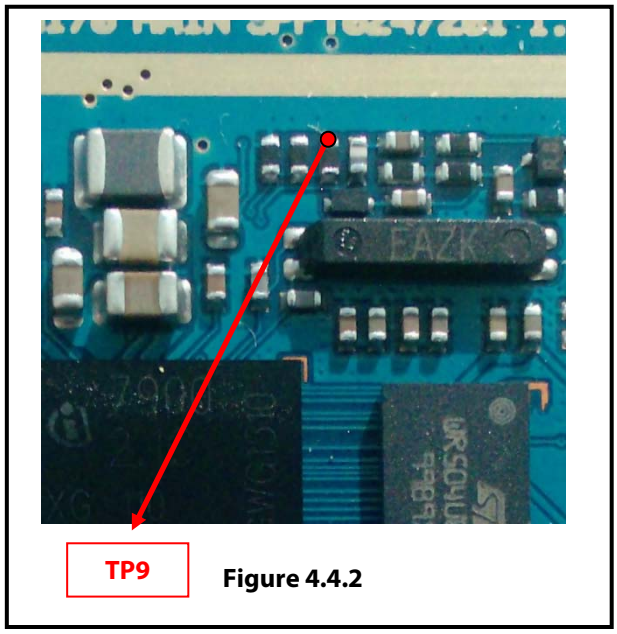
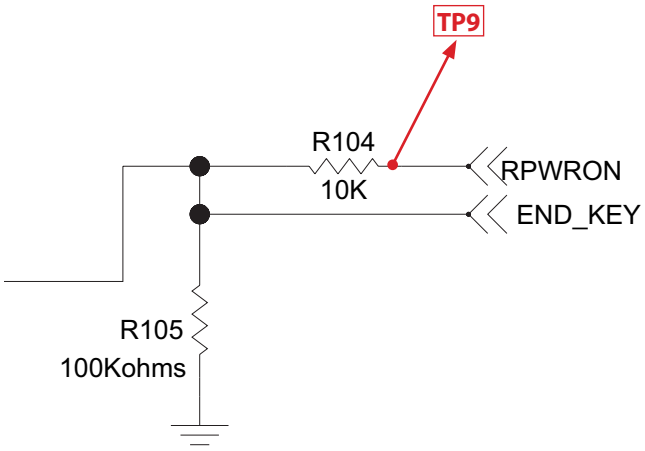
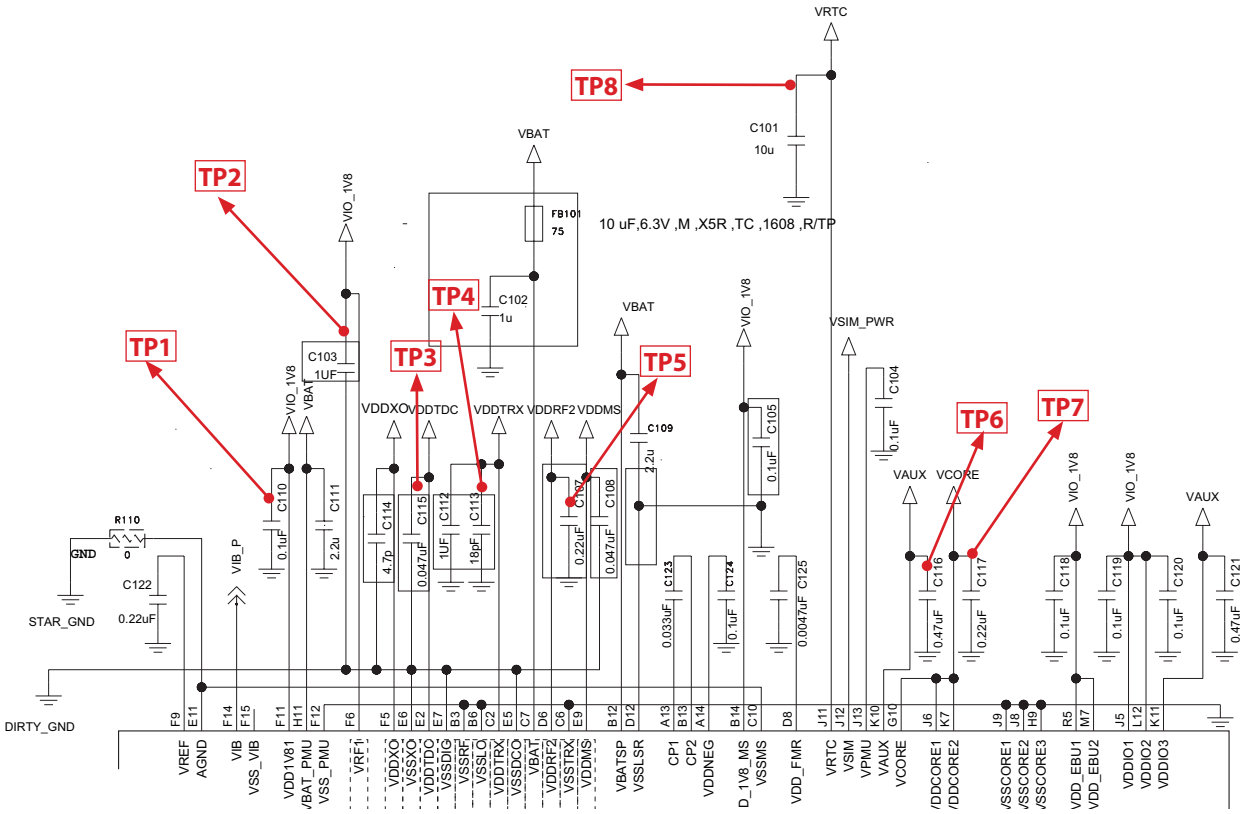


Figure 4.4.2

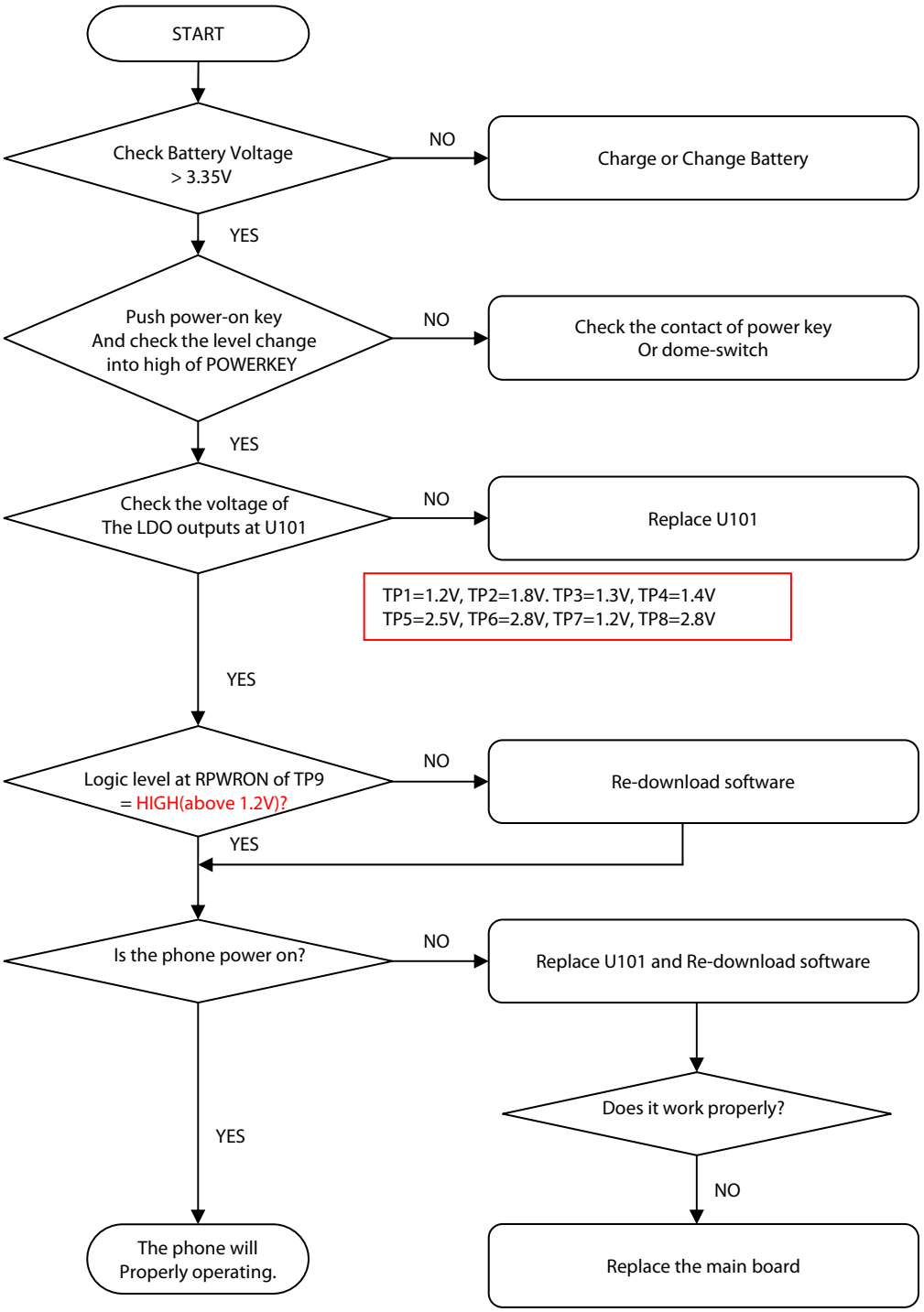




		Max. Curr	Volt.
TP1	VDD1V8	450mA	1.8V
TP7	VCORE	100mA	1.2V
	VANA	10mA	1.3V
TP6	VAUX	150mA	2.85V
TP8	VRTC	2mA	2.3V
	VSIM	30mA	2.85V
TP2	VRF1	60mA	1.8V
TP5	VRF2	70mA	2.5V
	VDDMMD	12mA	1.3V
TP3	VDD_TDC	6mA	1.3V
TP4	VDD_TRX	30mA	1.4V
	VDD_NEG	100mA	-1.3V

Figure 4.4.4 power block of LG-A175

CHECKING FLOW



4.5 Charging Trouble

TEST POINT

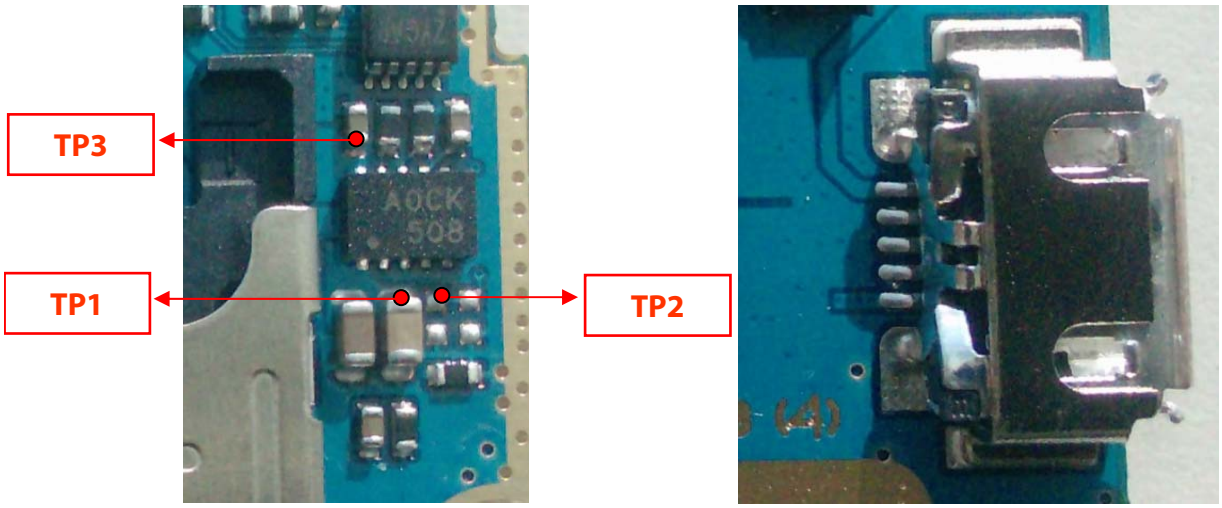
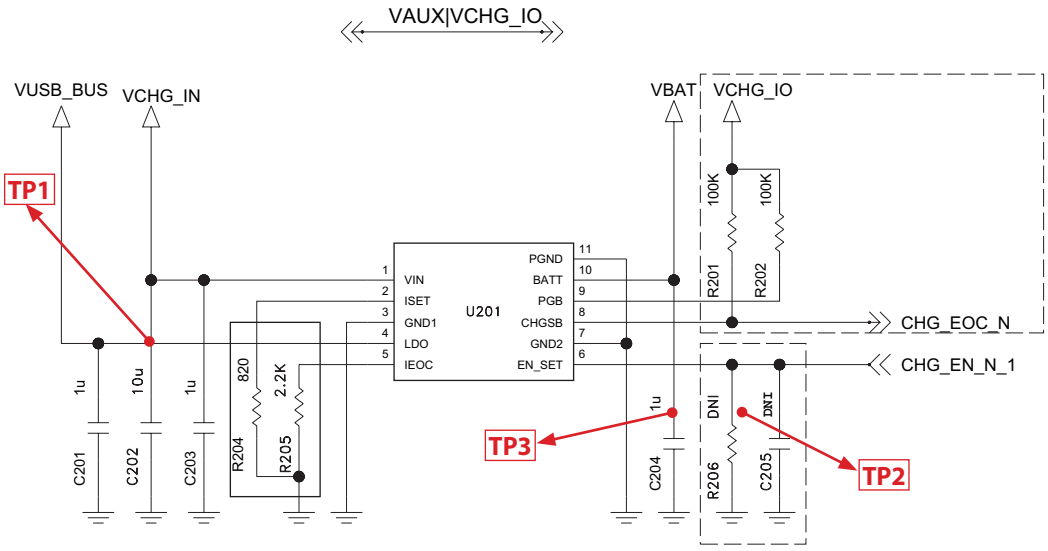


Figure 4.5.1

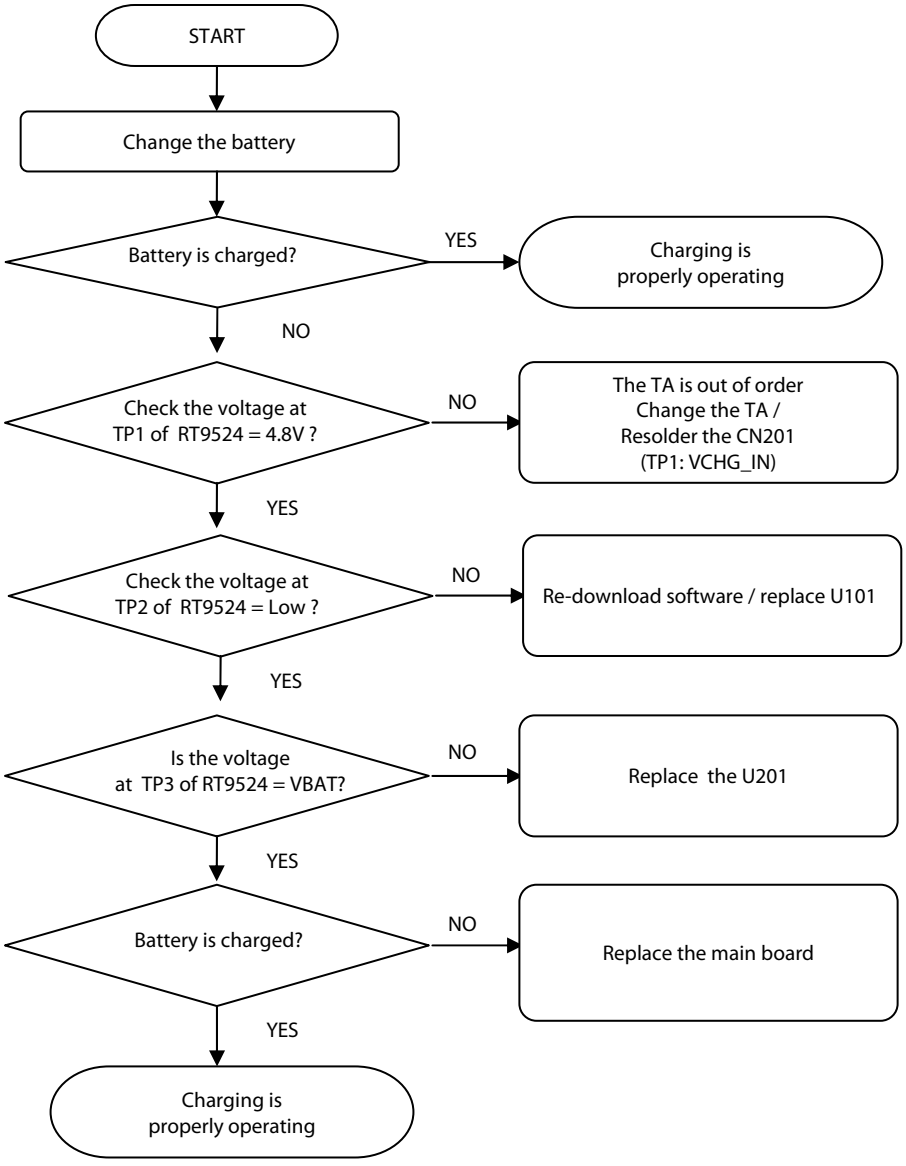
CIRCUIT




```
ISET : Charging current set
ISET : 530/R(K)
IEOC : End of Charging current set
IEOC : R/200  %
```

Figure 4.5.2

CHECKING FLOW



4.6 Vibrator Trouble

TEST POINT

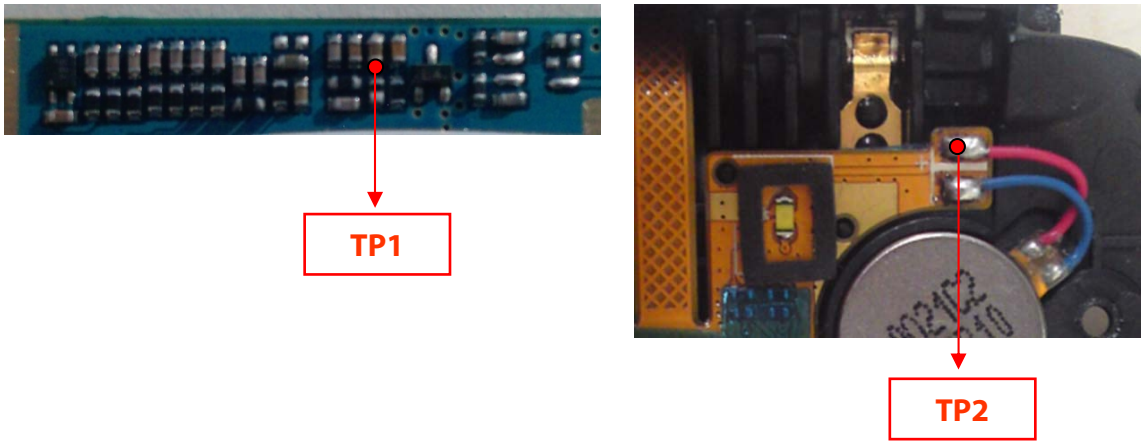


Figure 4.6.1

CIRCUIT

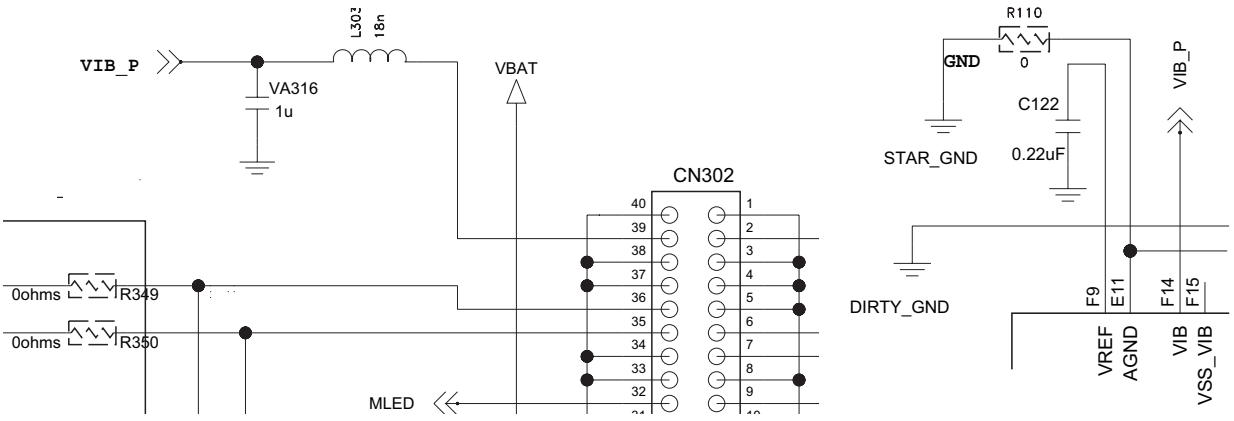
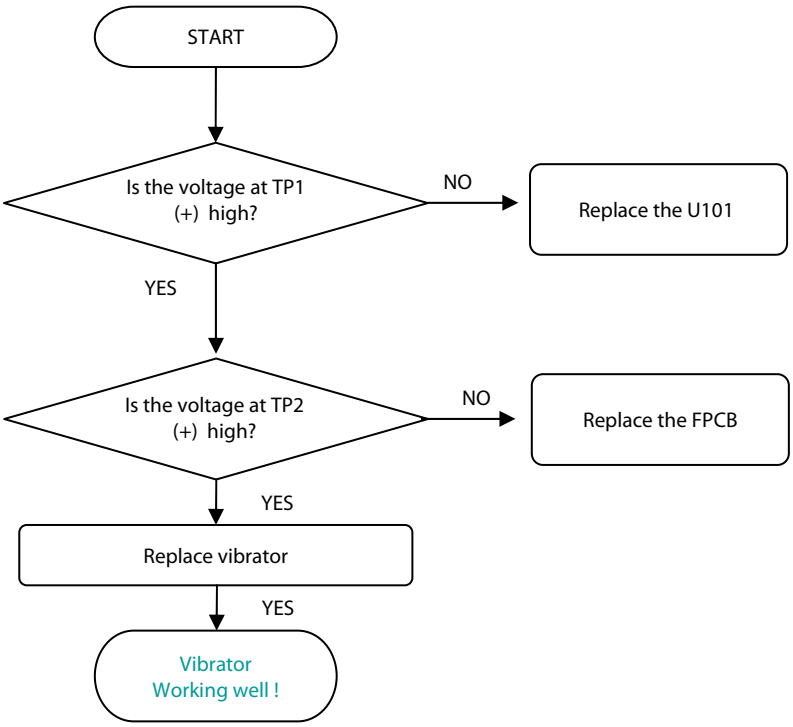


Figure 4.6.2

CHECKING FLOW

SETTING : Enter the engineering mode, and set vibrator on at vibration of BB test menu



4.7 LCD Trouble

TEST POINT

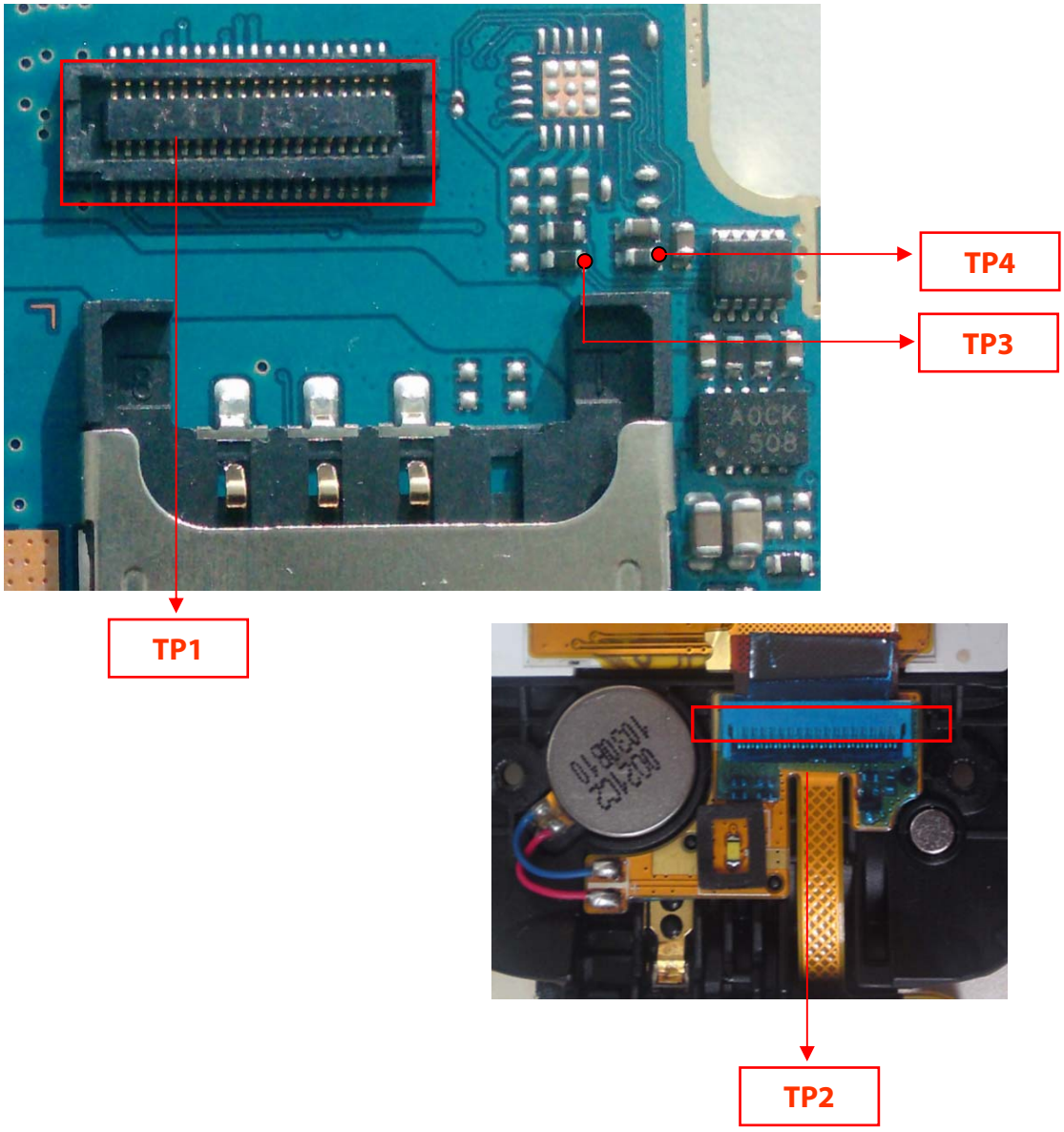
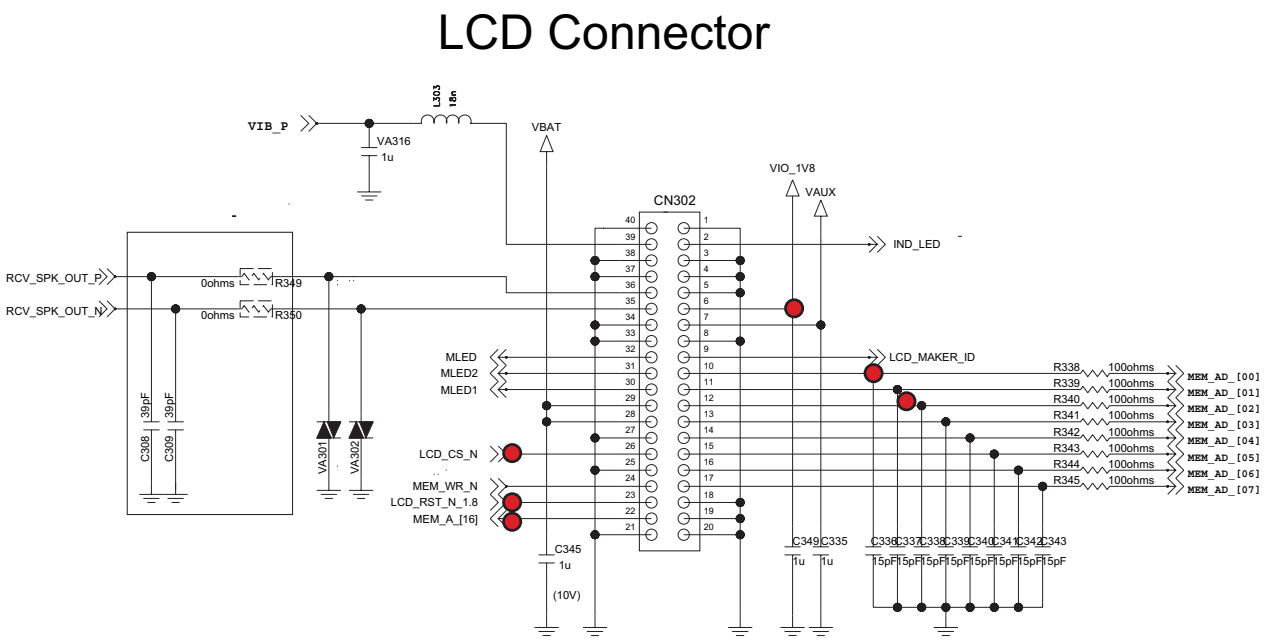


Figure 4.7.1

CIRCUIT



2CH LED DRIVER

(for LCD)

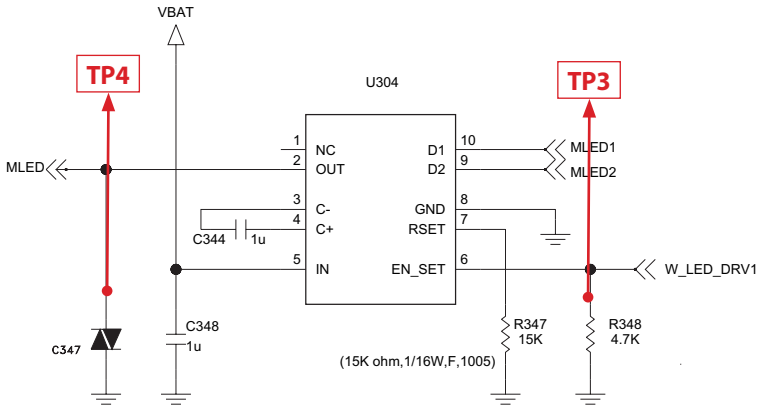
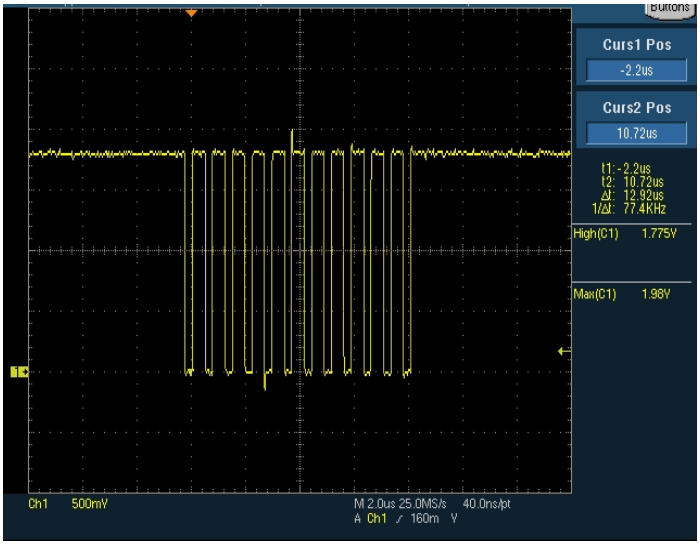
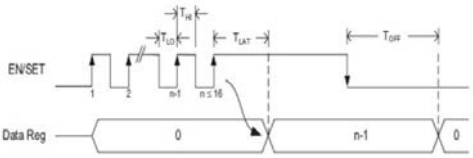


Figure 4.7.2

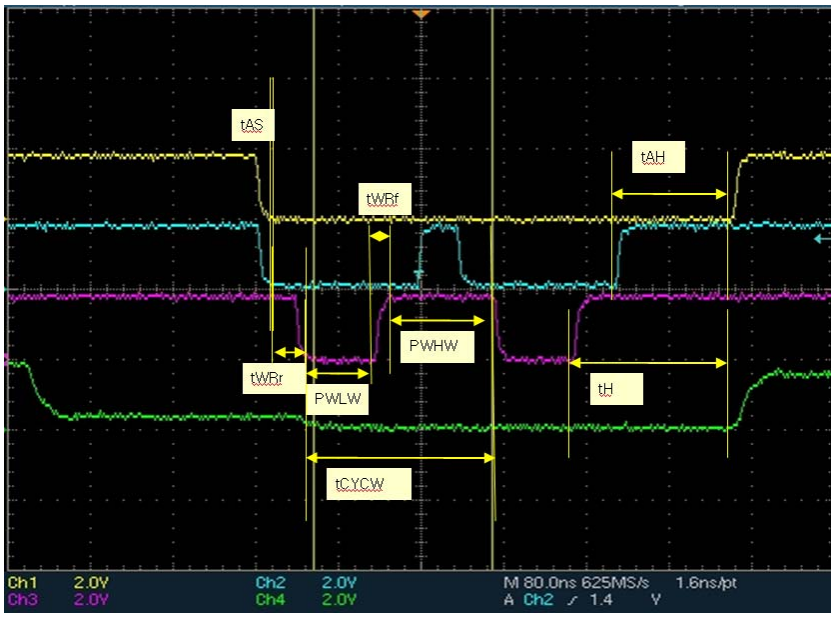
Waveform





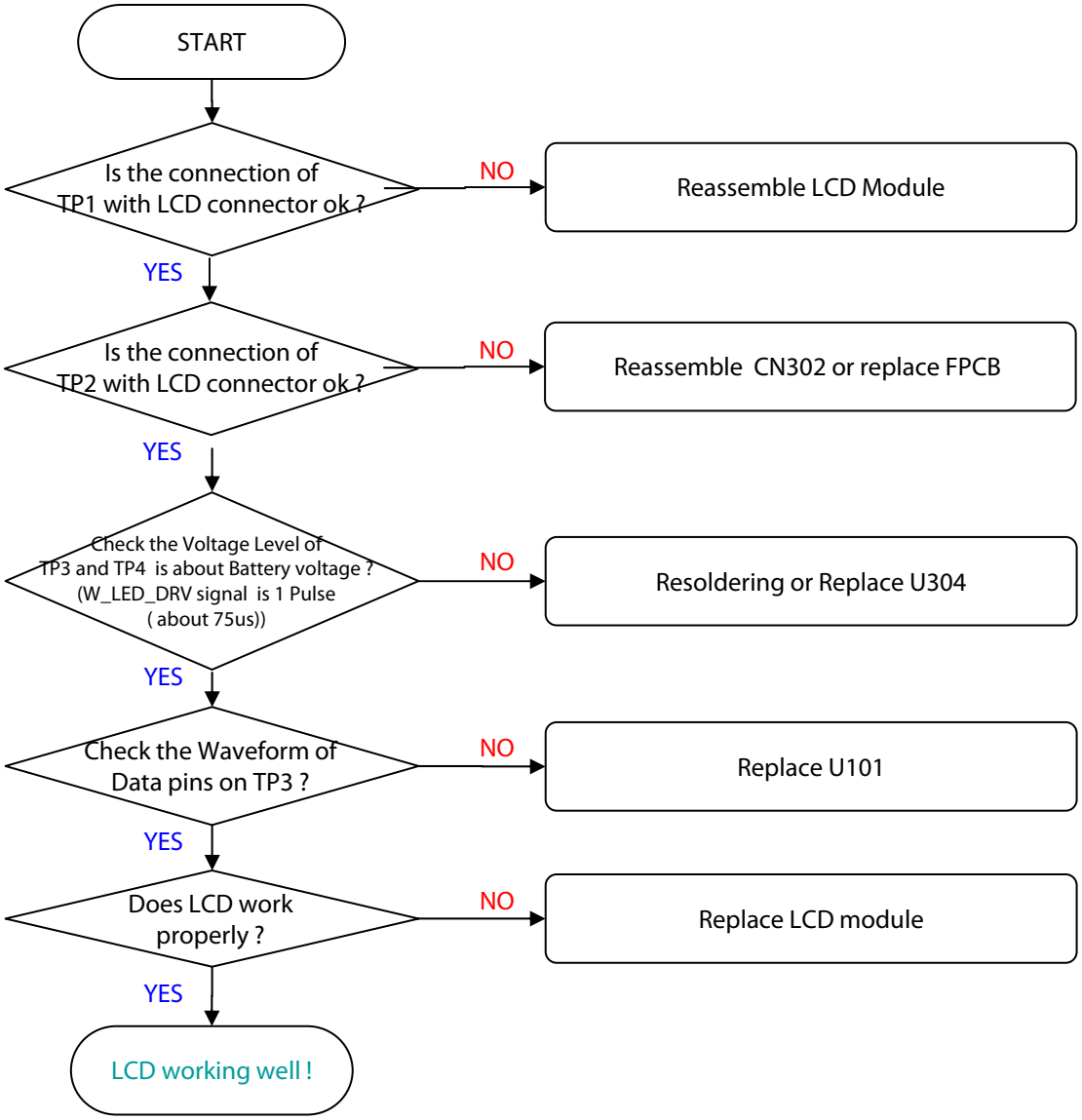
Data	EN Rising Edges	D1-D2 Current (mA)
1	1	20
2	2	18.7
3	3	17.3
4	4	16
5	5	14.7
6	6	13.3
7	7	12
8	8	10.7
9	9	9.3
10	10	8
11	11	6.7
12	12	5.3
13	13	4
14	14	2.7
15	15	1.3
16	16	0.63

Graph 4.7.1. LCD Backlight Dimming Control Signal Waveform



Graph 4.7.2. LCD Data Waveform

CHECKING FLOW



4.8 Speaker Trouble

TEST POINT

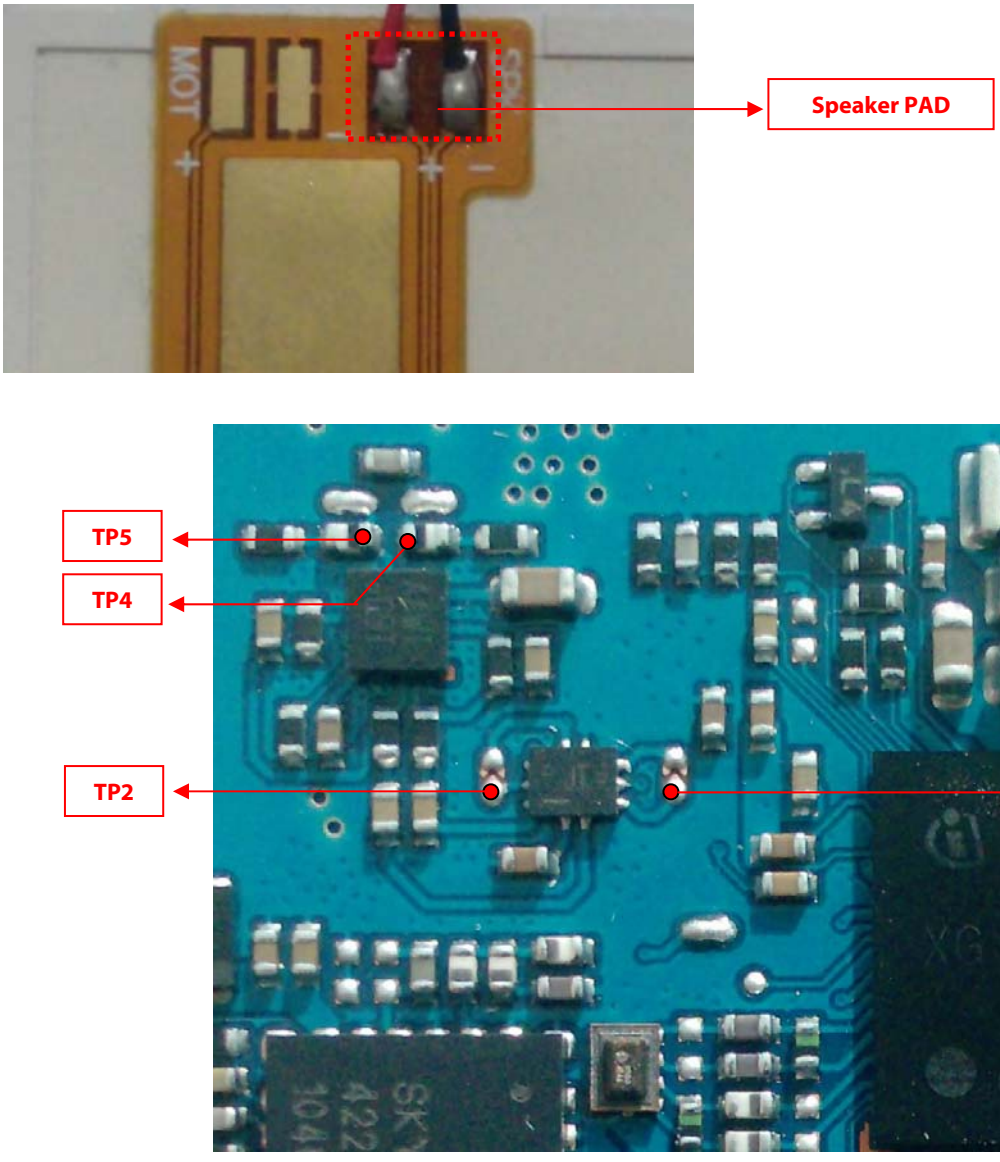
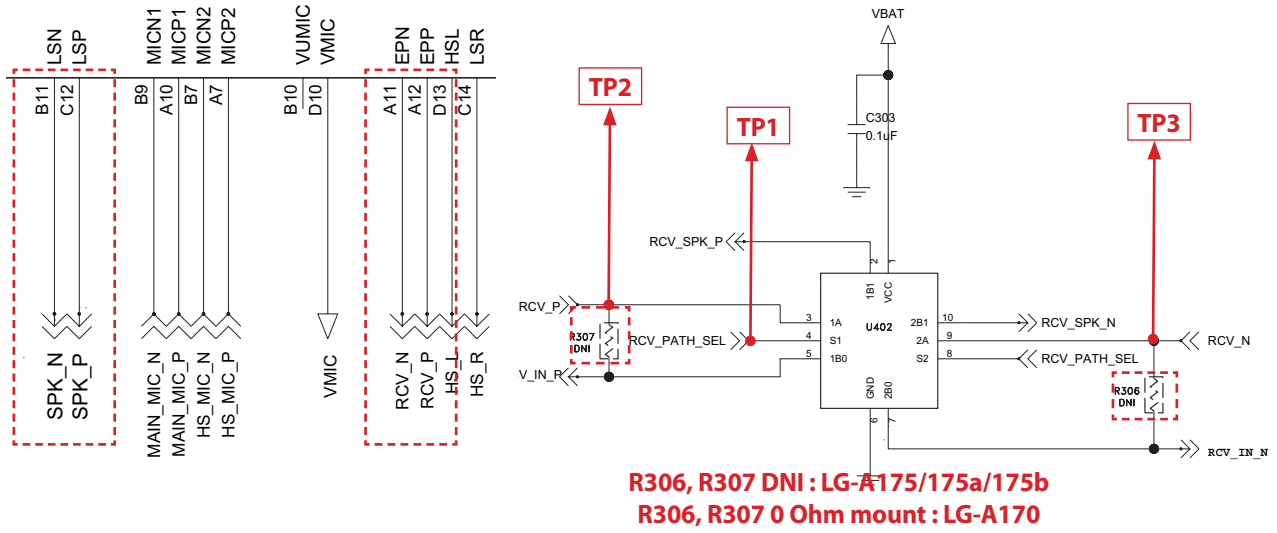


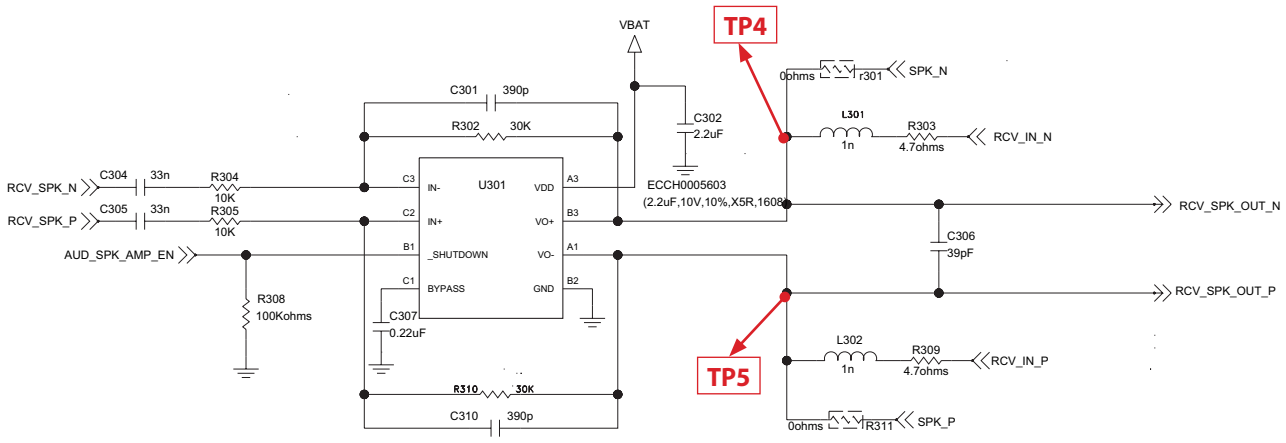
Figure 4.8.1

CIRCUIT

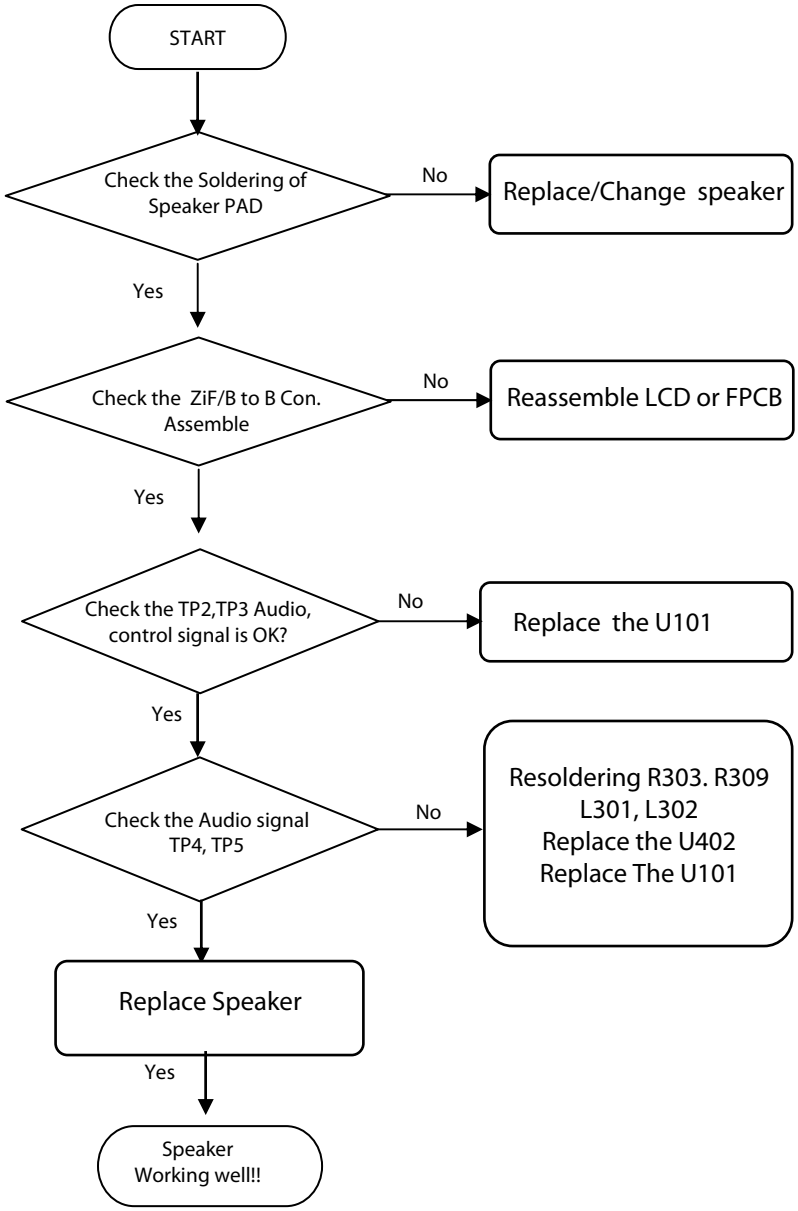


R306, R307 DNI : LG-A175/175a/175b
R306, R307 0 Ohm mount : LG-A170

SPEAKER & RECEIVER



CHECKING FLOW



4.9 Earphone Trouble

TEST POINT

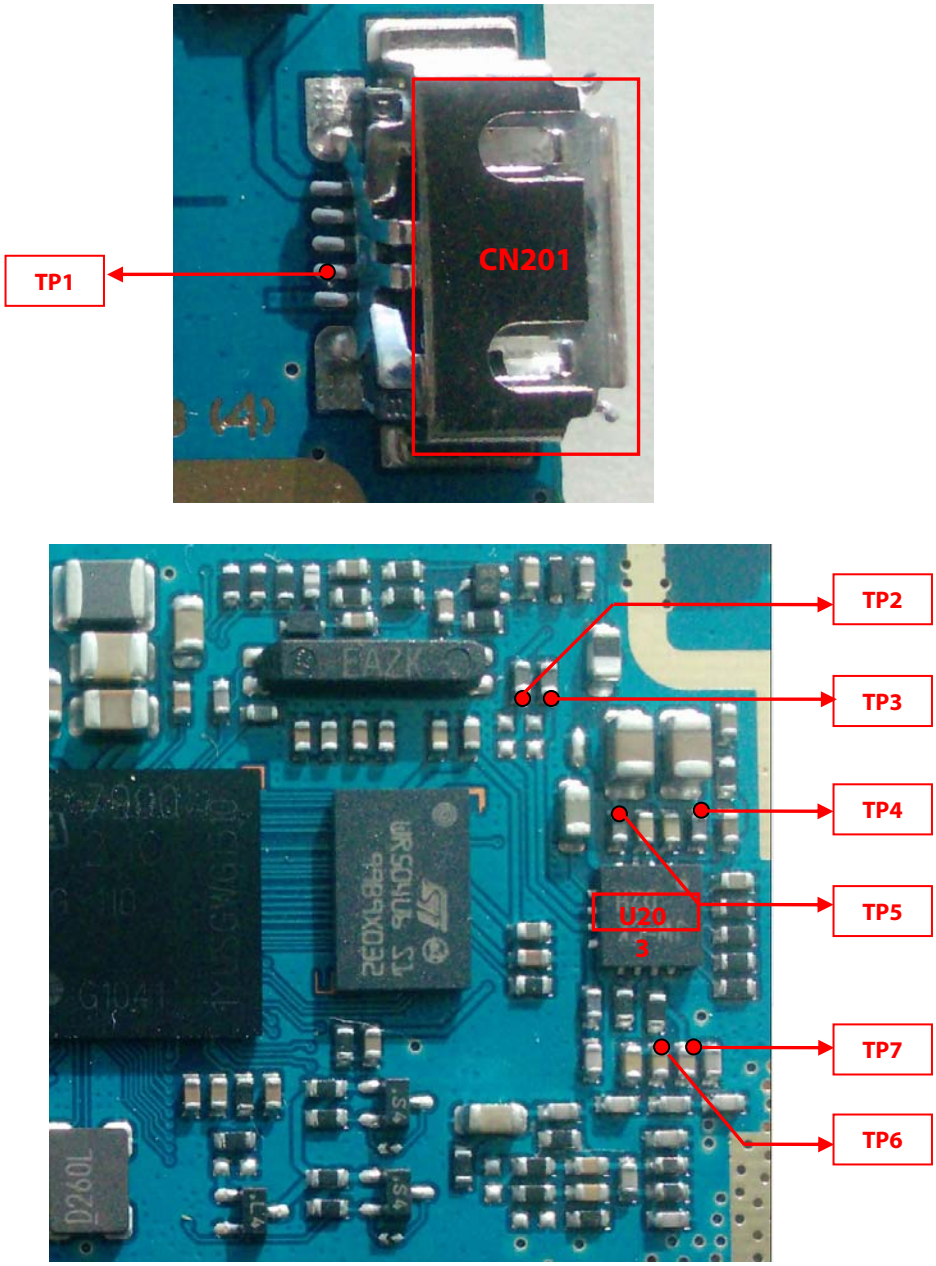
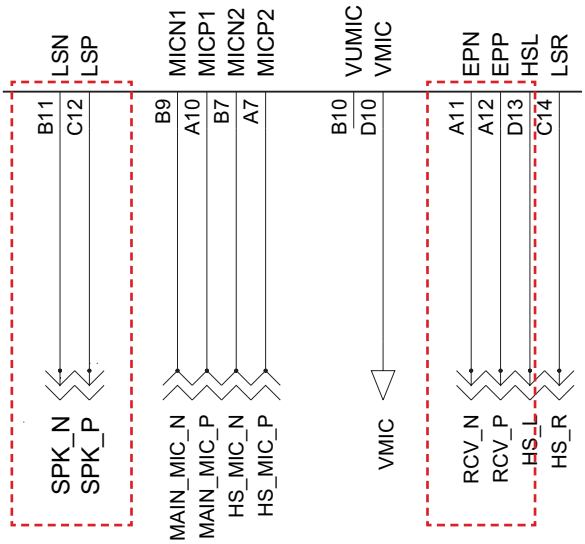
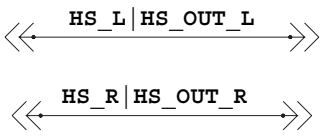


Figure 4.9.1

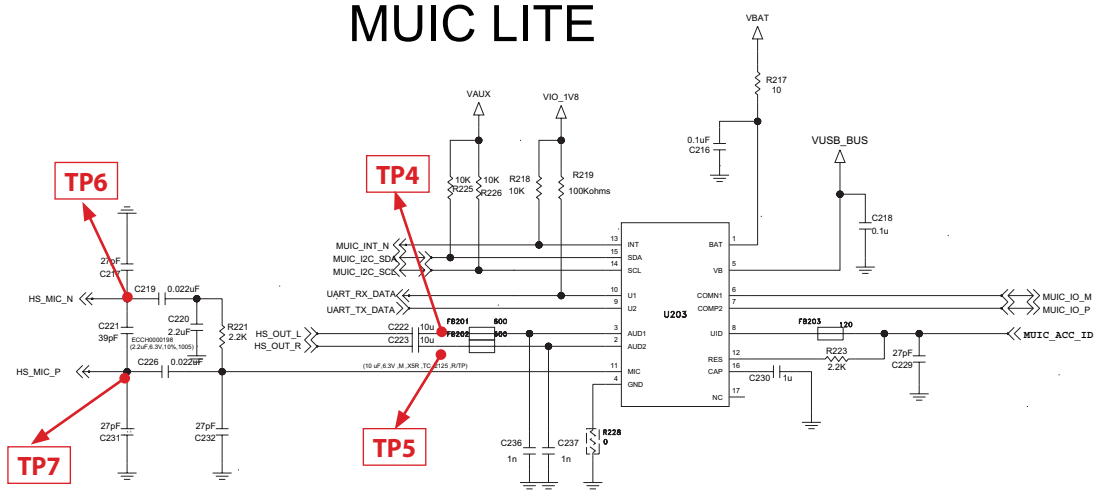
CIRCUIT

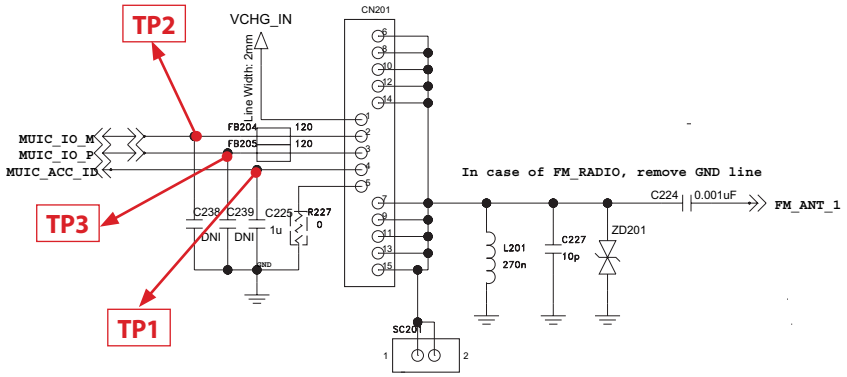


Headset Path

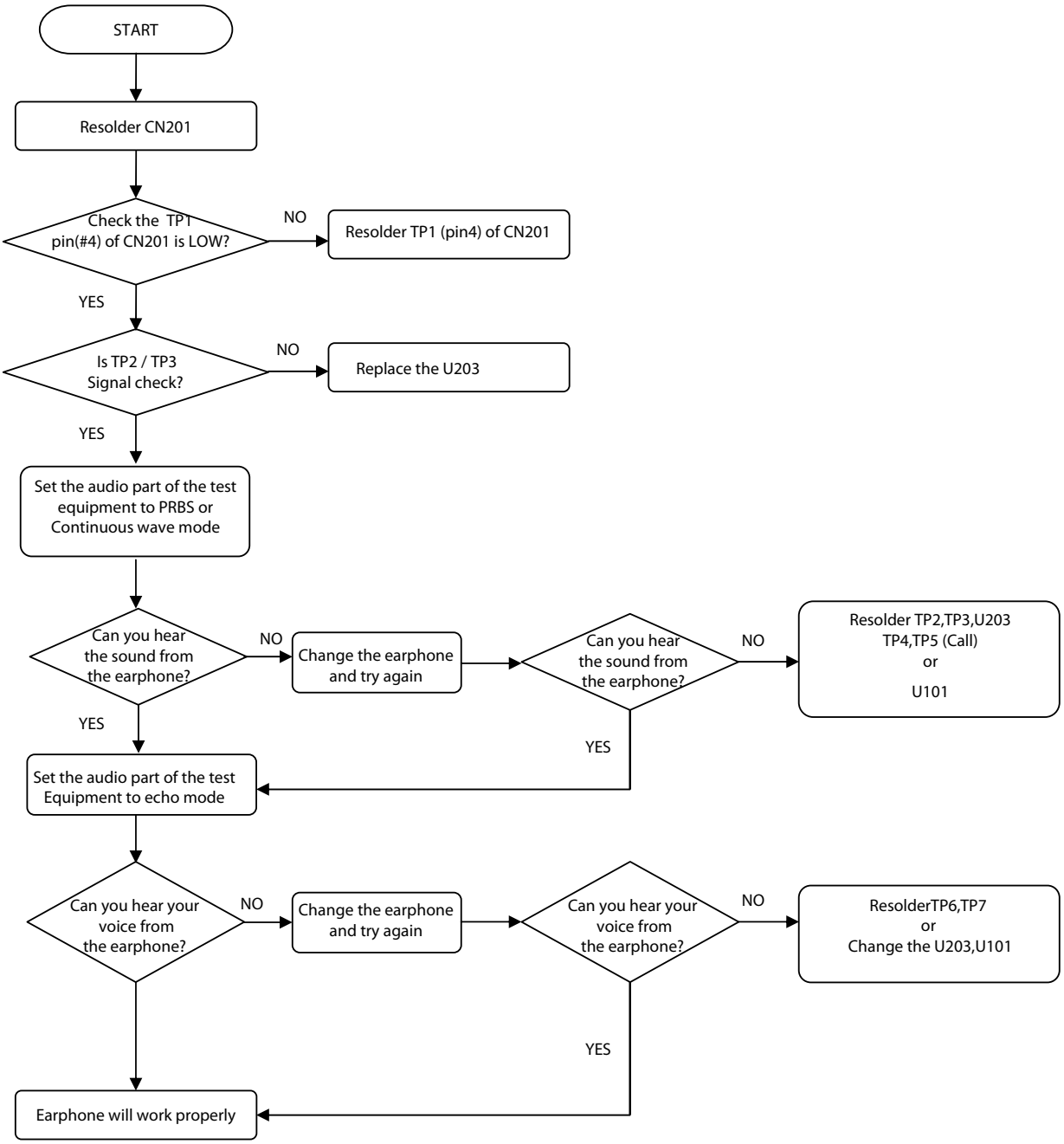


MUIC LITE





CHECKING FLOW



4.10 Microphone Trouble

TEST POINT

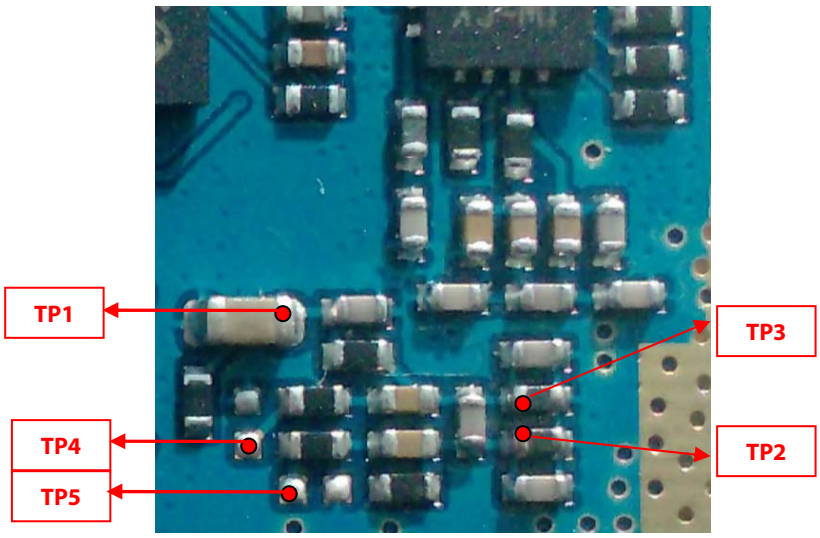
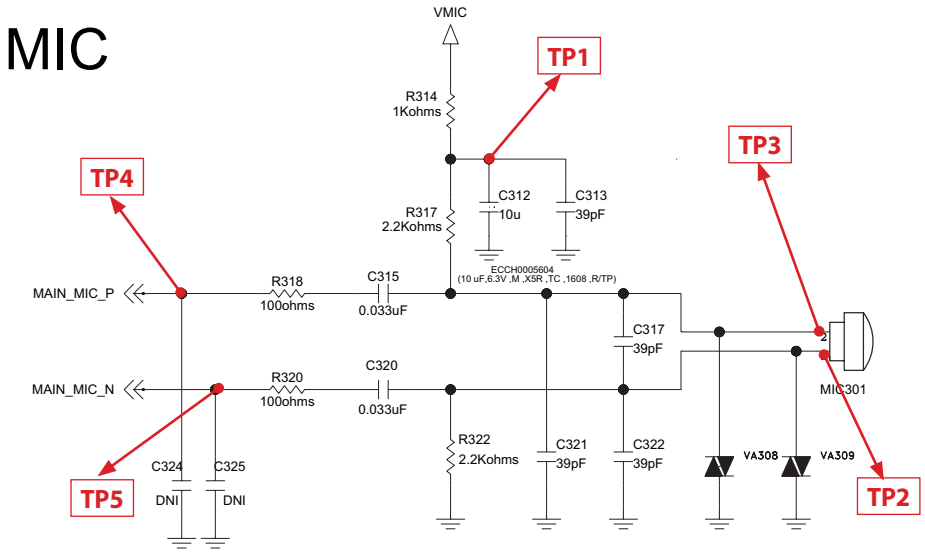


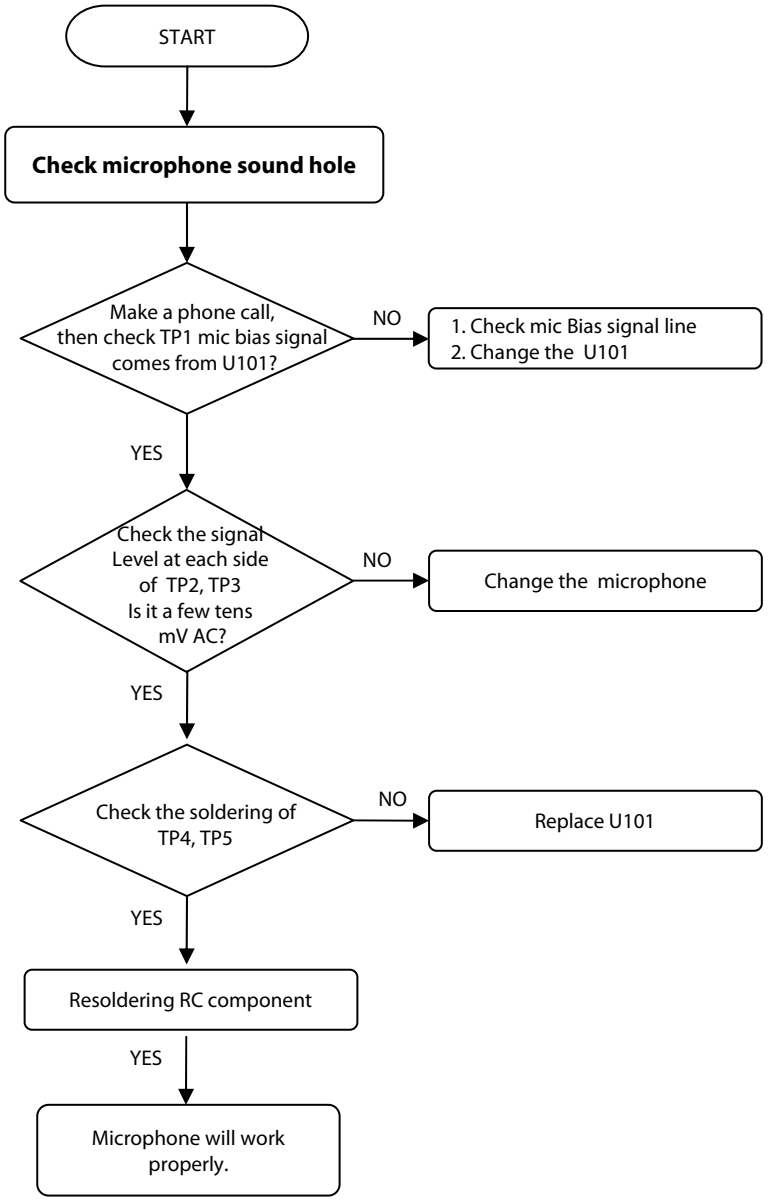
Figure 4.10.1

CIRCUIT



CHECKING FLOW

SETTING : After initialize Agilent 8960, Test EGSM900, DCS mode (or GSM850, PCS mode)



4.11 SIM Card Interface Trouble

TEST POINT

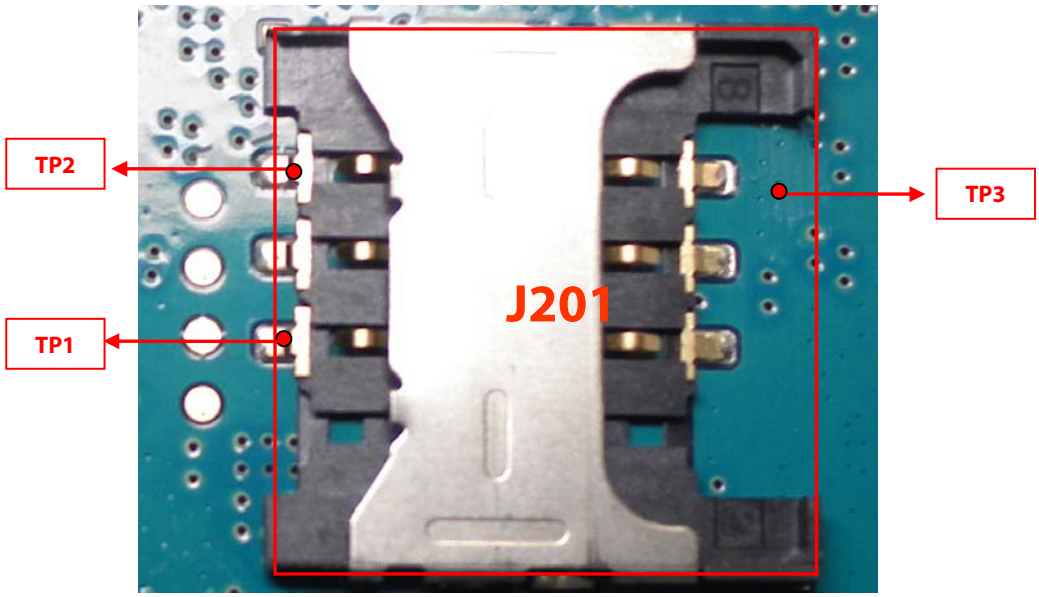
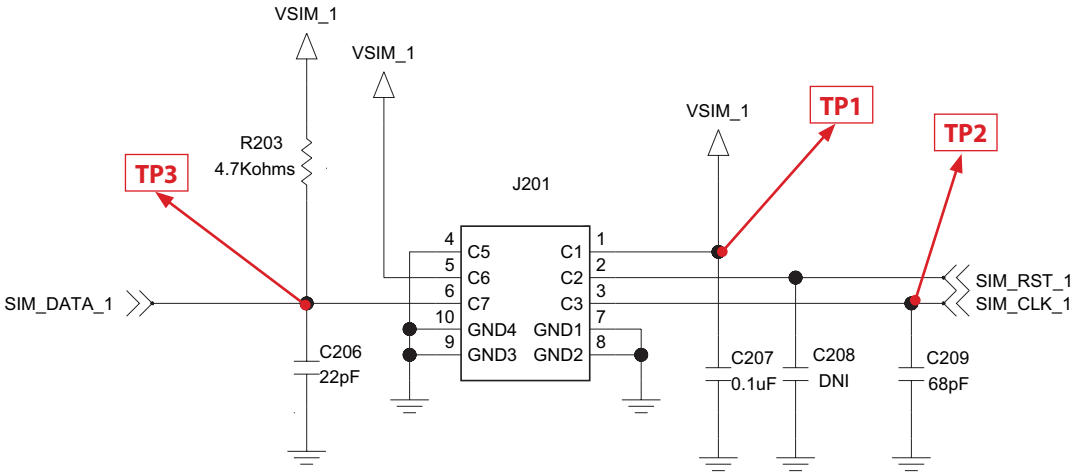


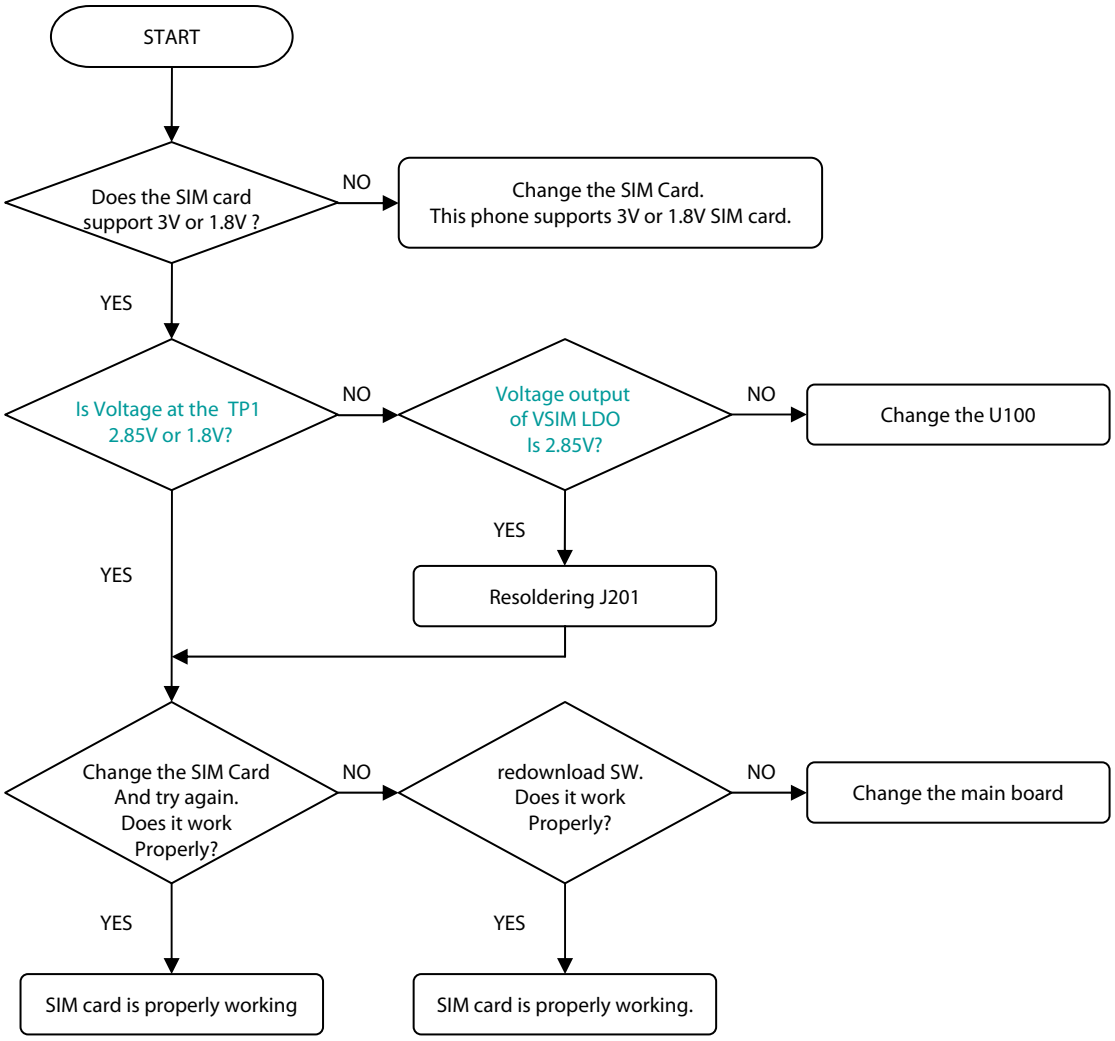
Figure 4.11.1

CIRCUIT

SIM_CONNECTOR



CHECKING FLOW



4.12 KEY backlight Trouble

TEST POINT

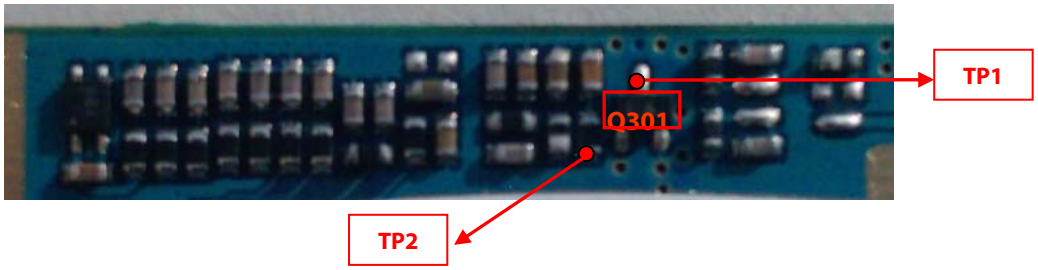
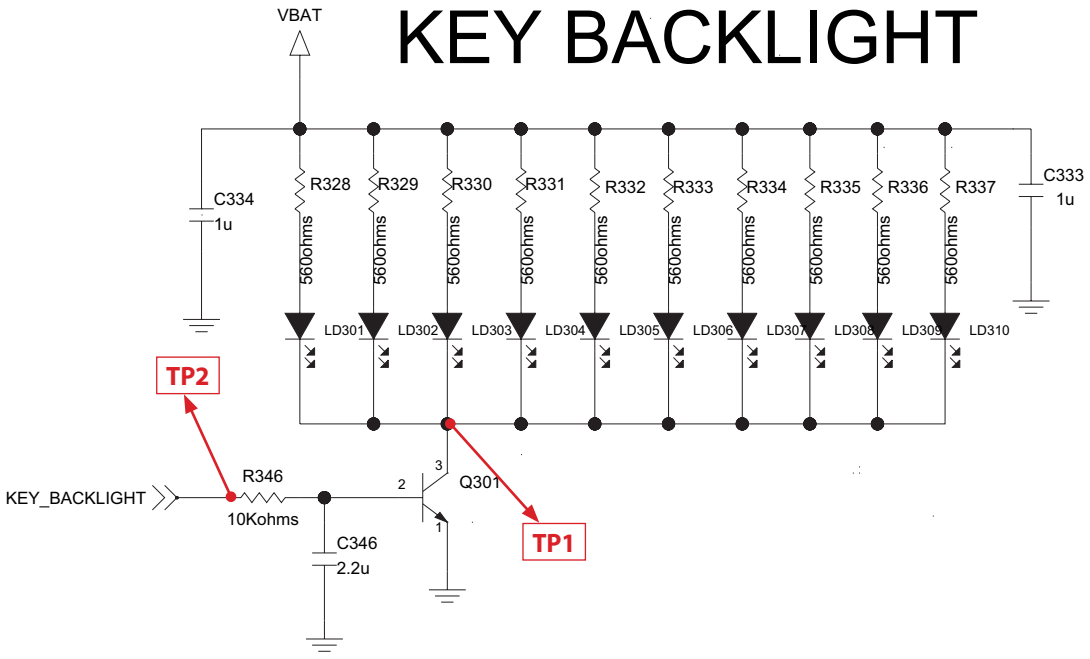
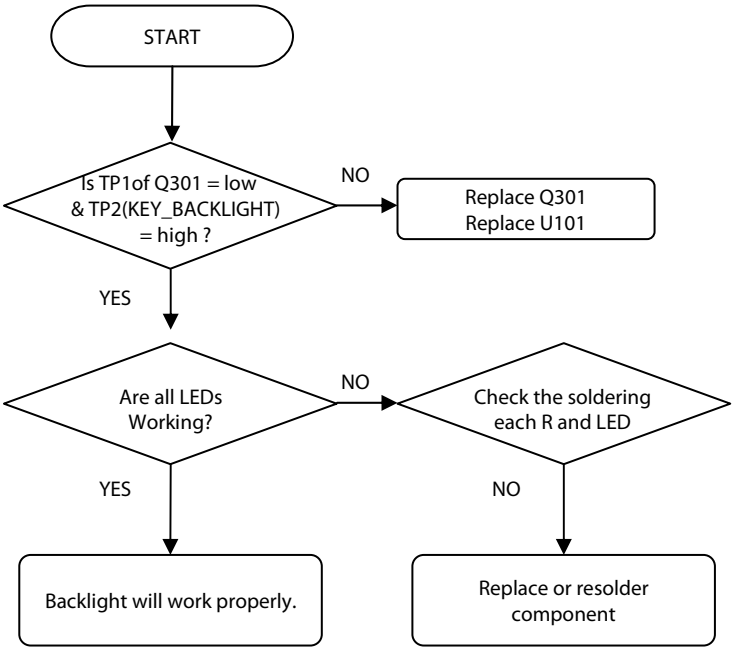


Figure 4.12.1

CIRCUIT



CHECKING FLOW



4.13 FM Radio Trouble

TEST POINT

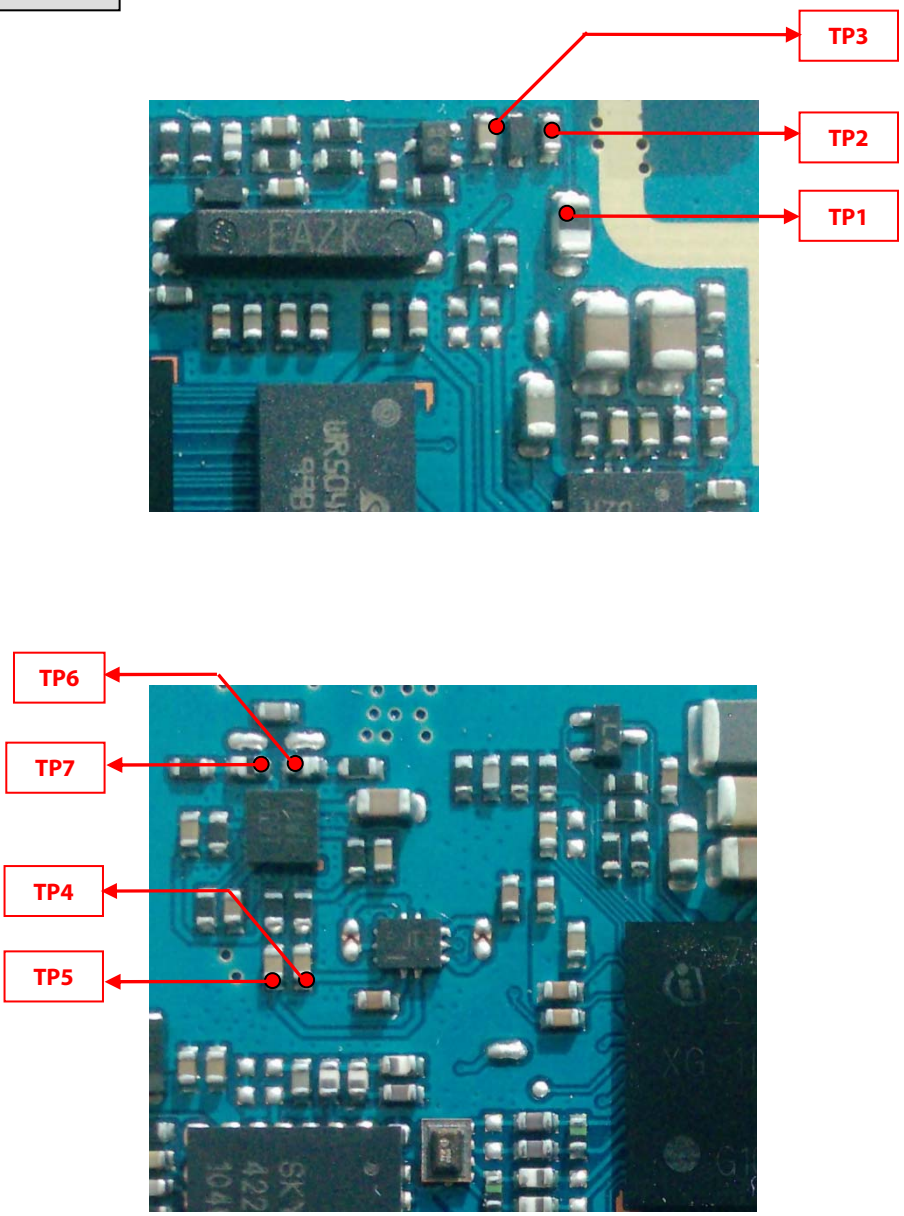
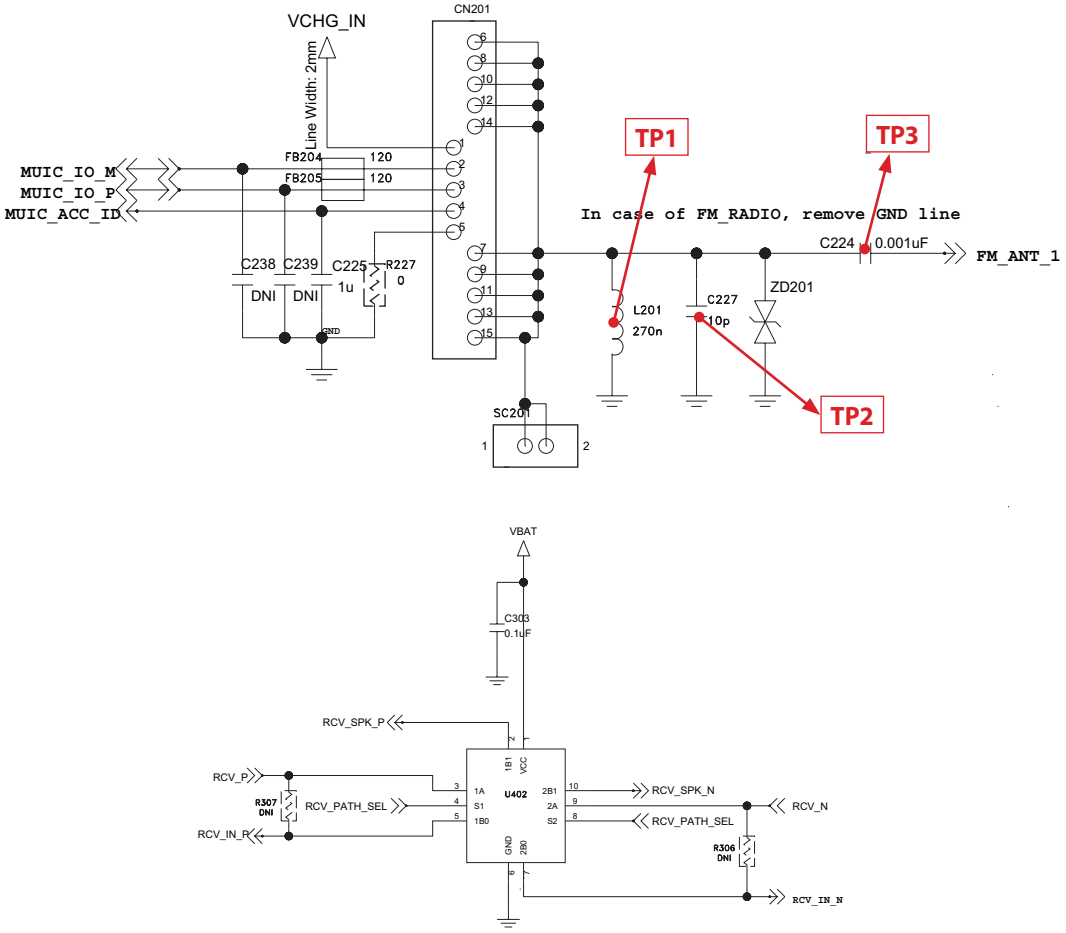
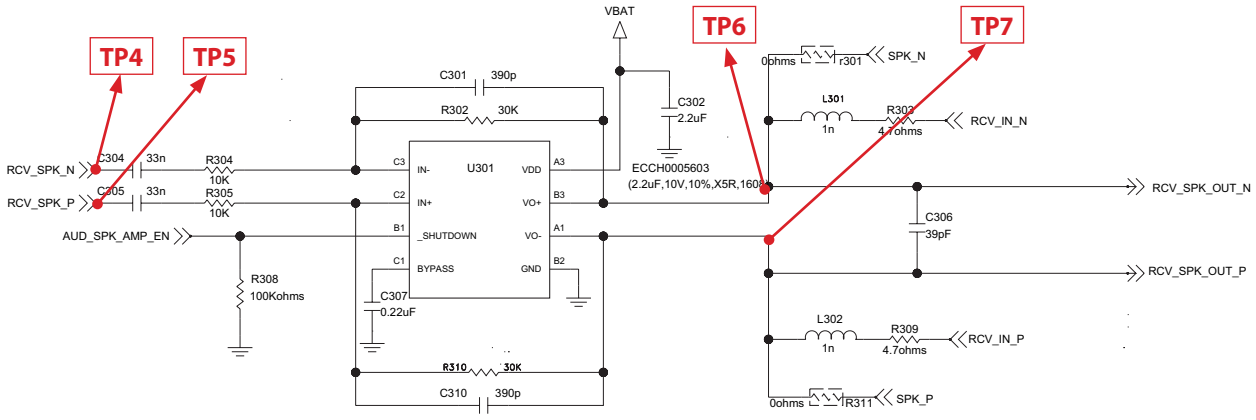


Figure 4.13.1

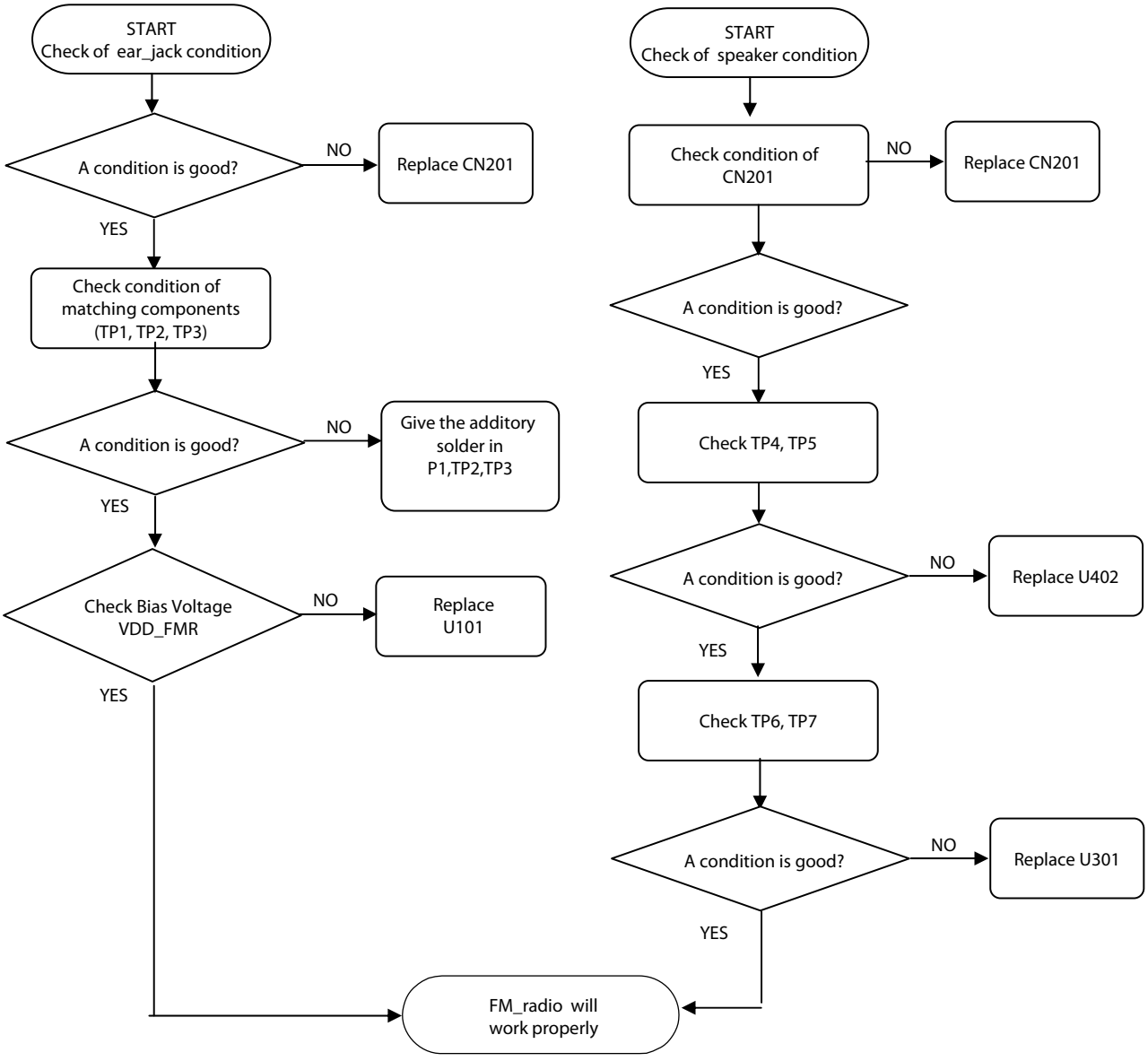
CIRCUIT



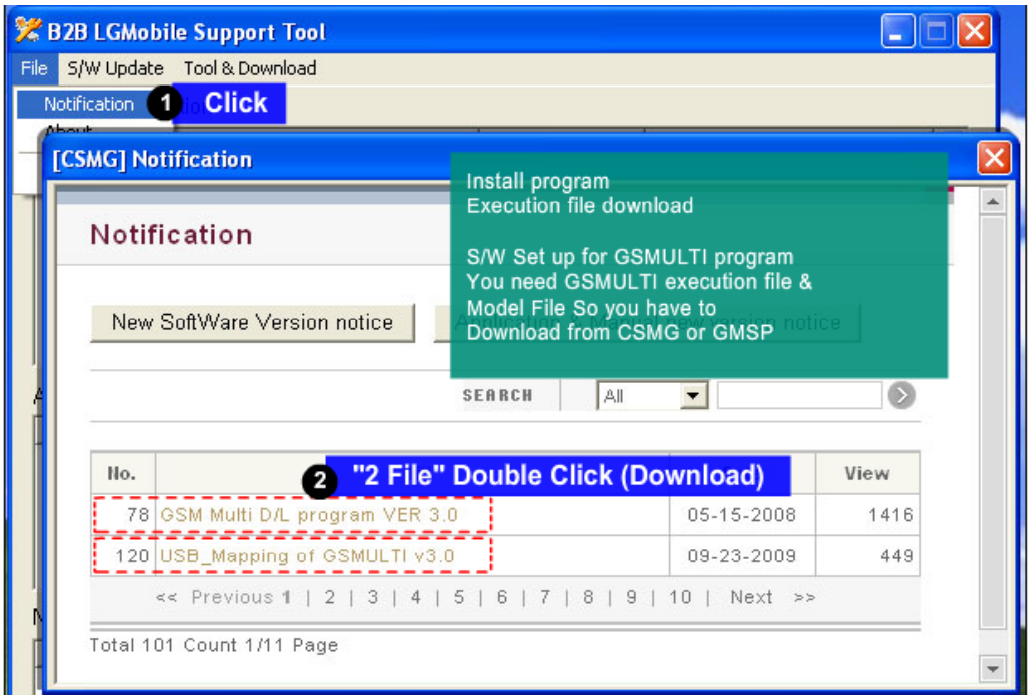
SPEAKER & RECEIVER

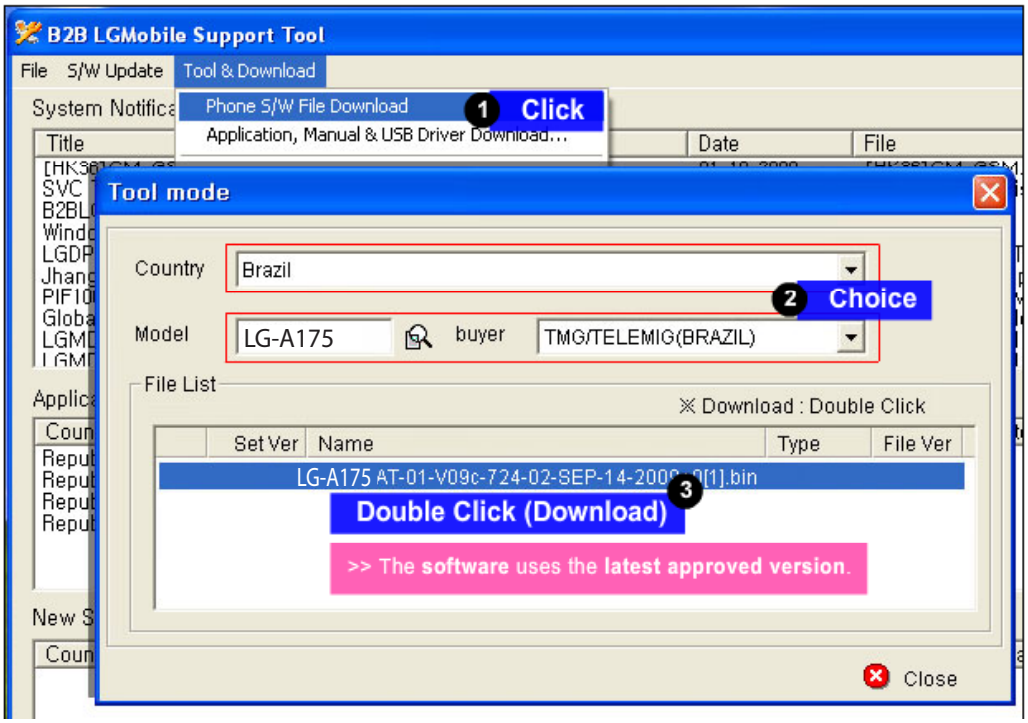


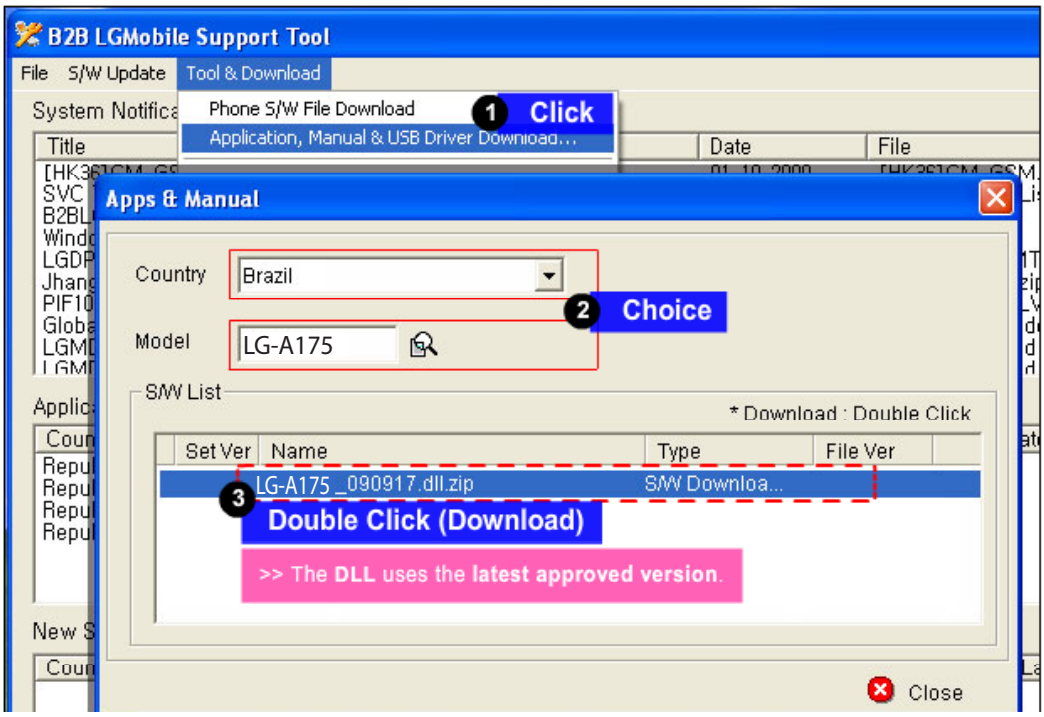
CHECKING FLOW

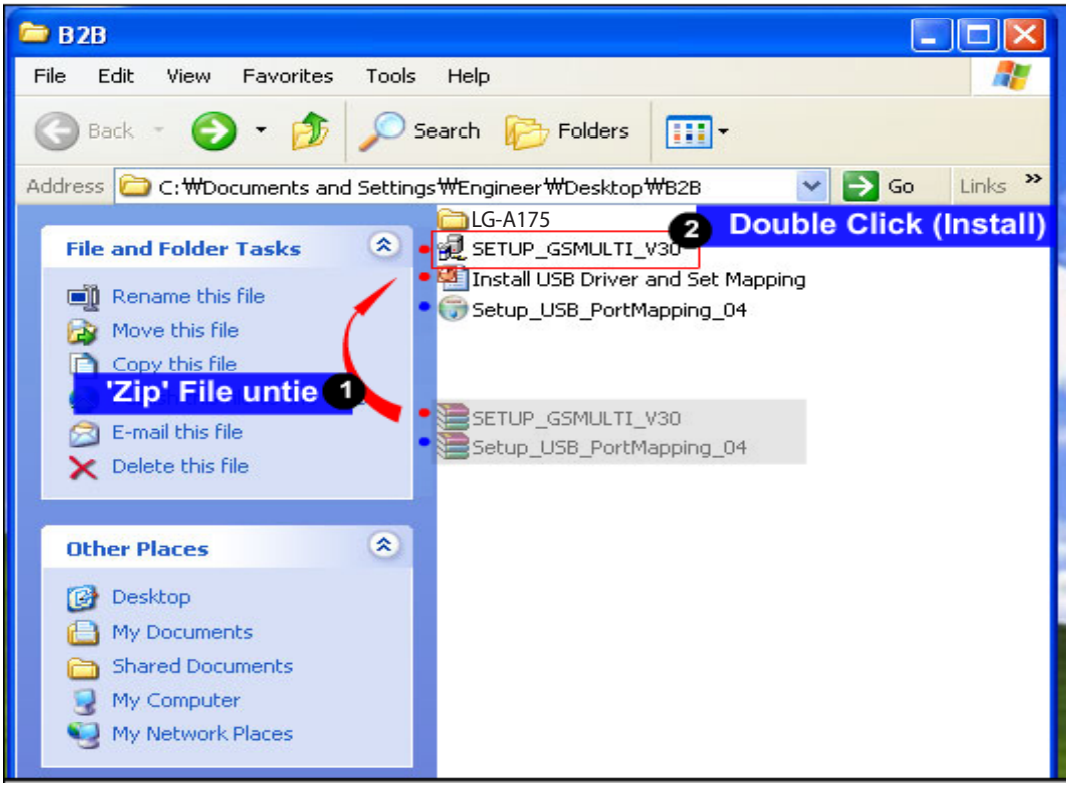


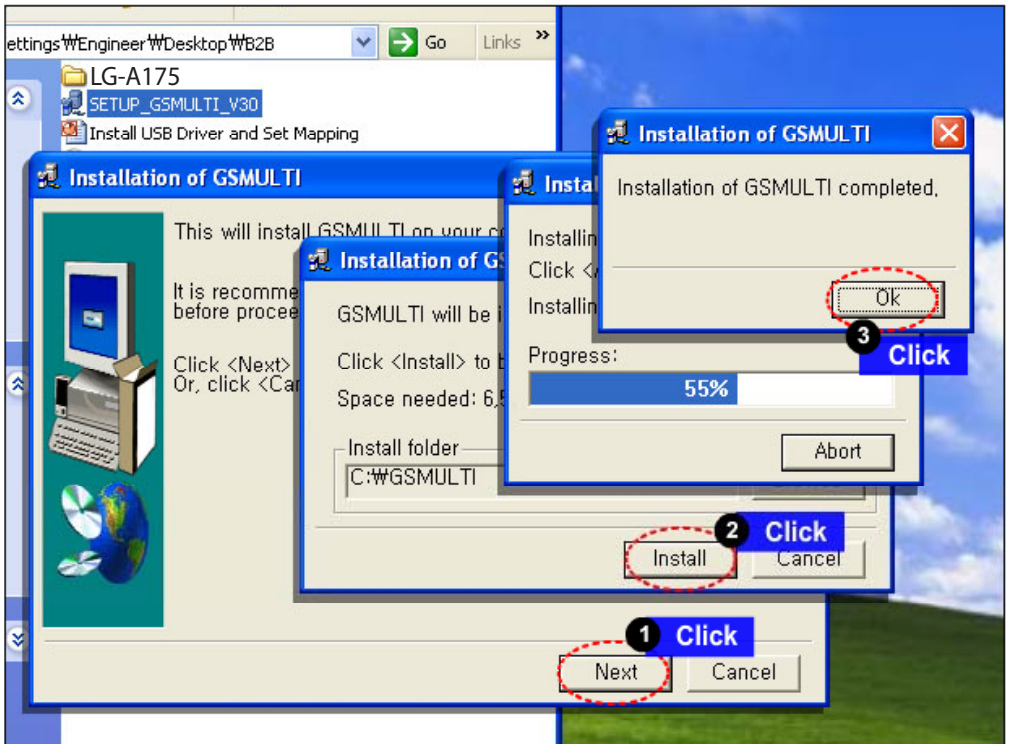
5. DOWNLOAD

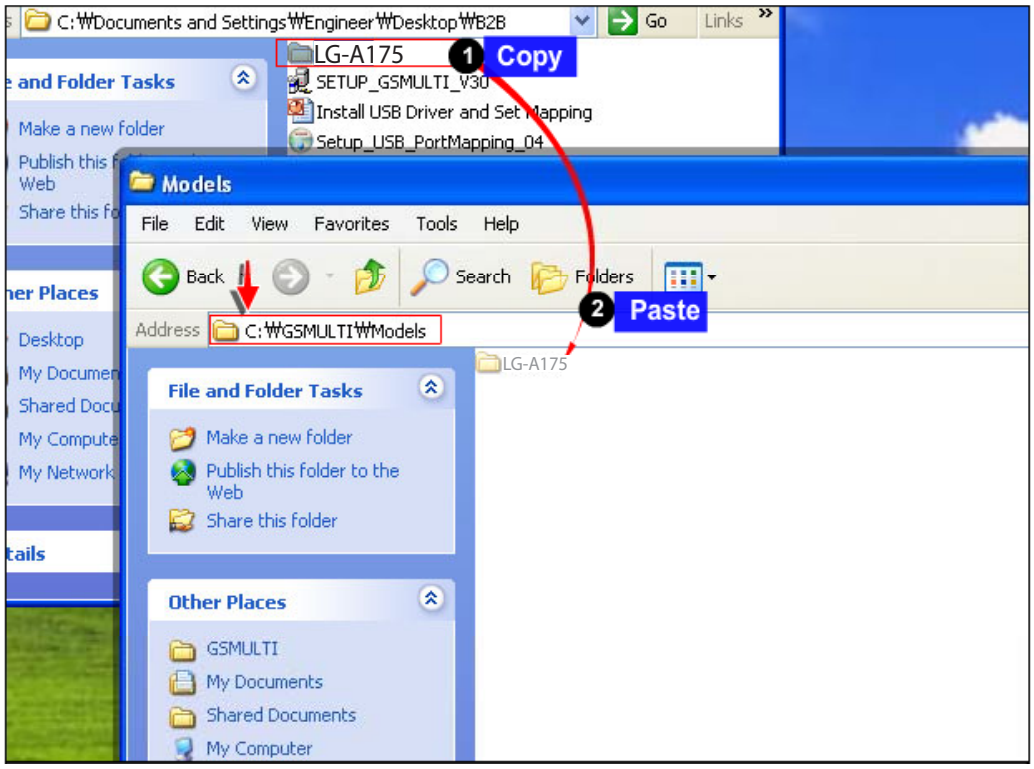


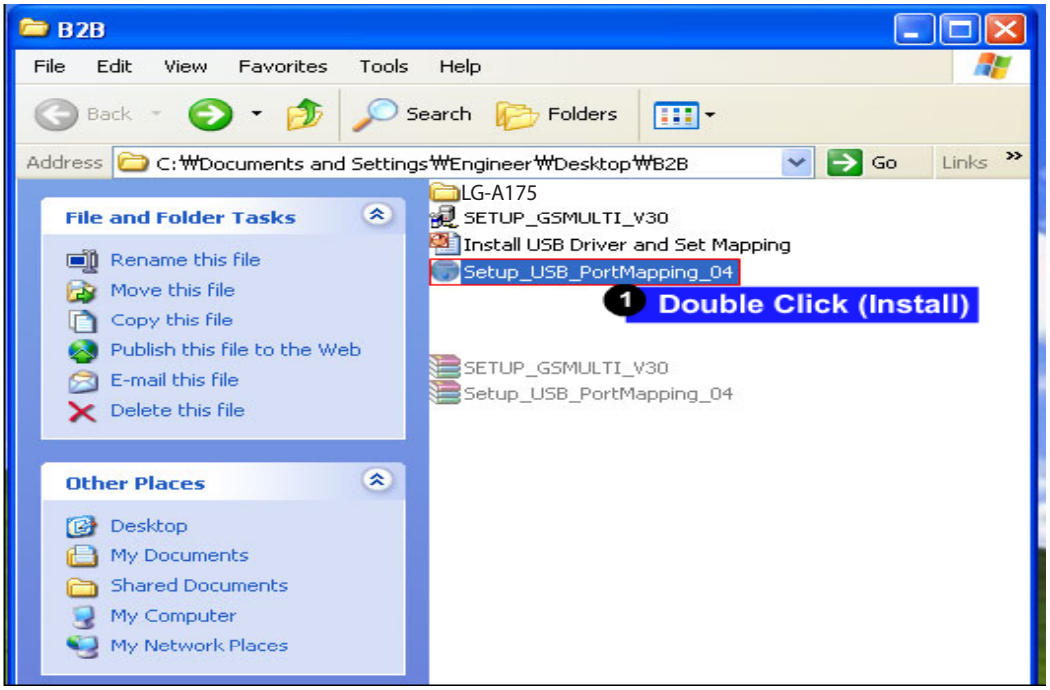


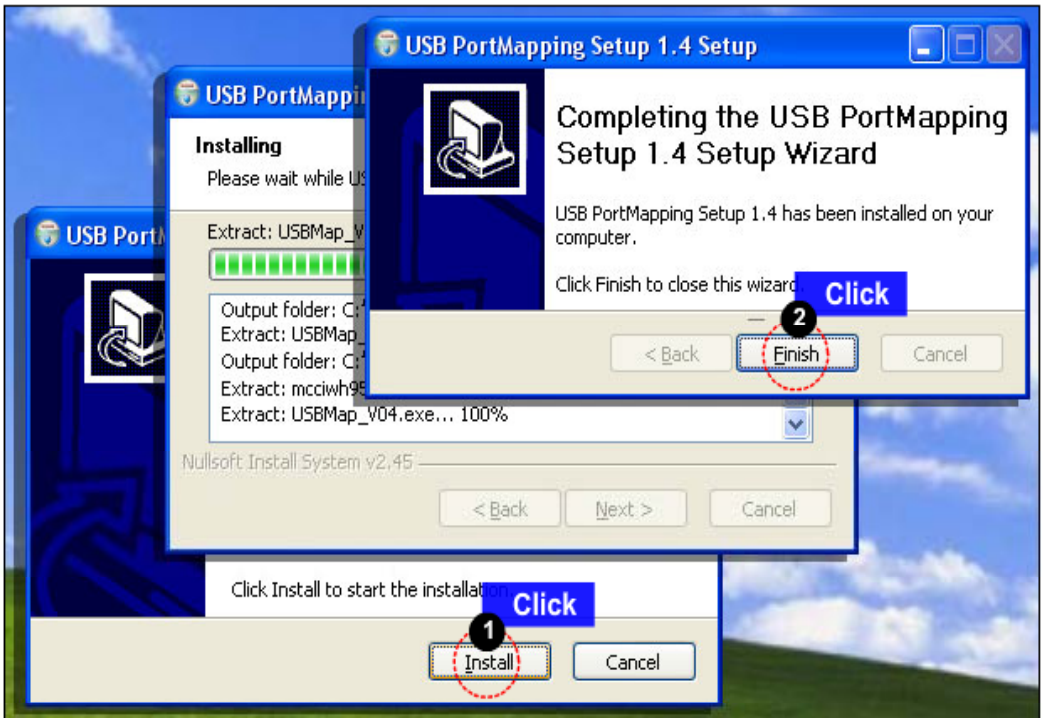


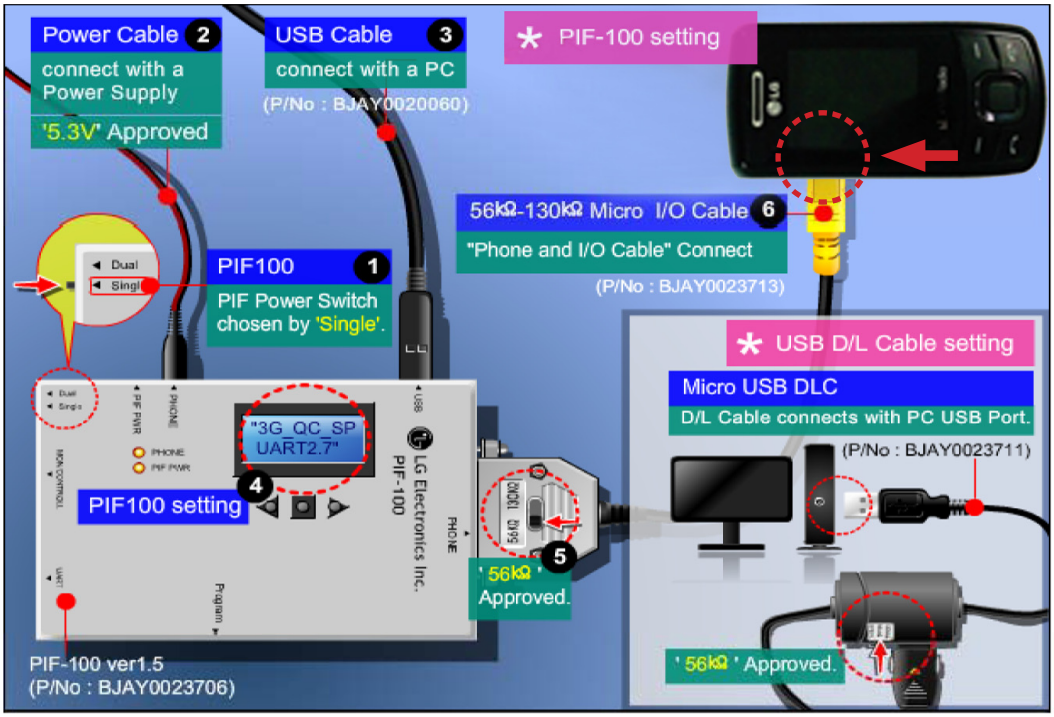


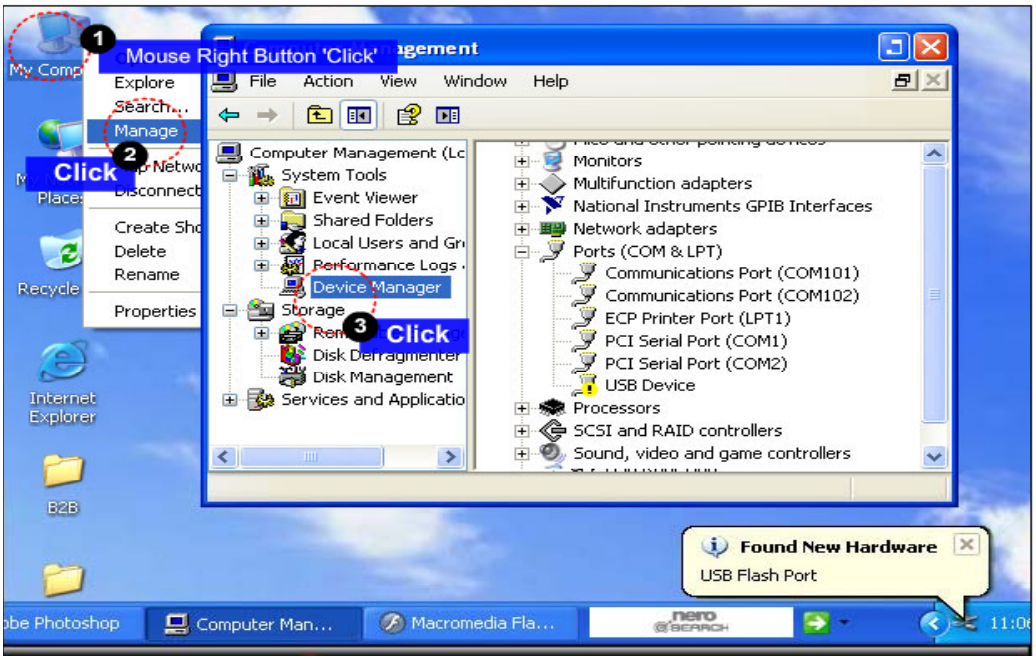


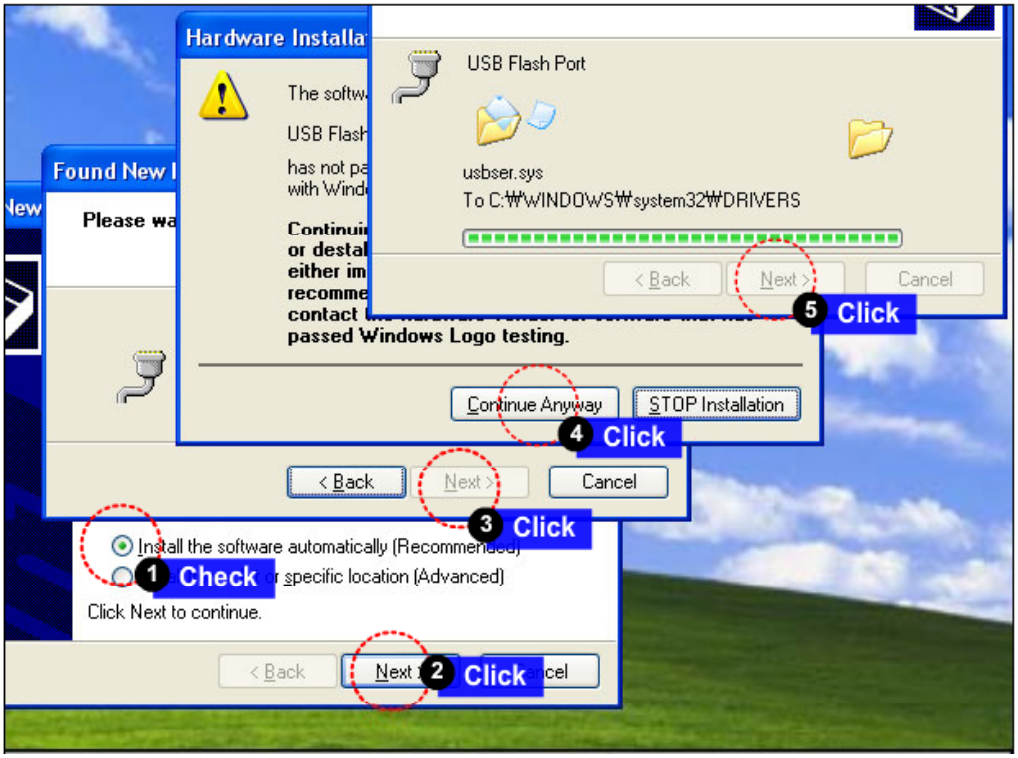


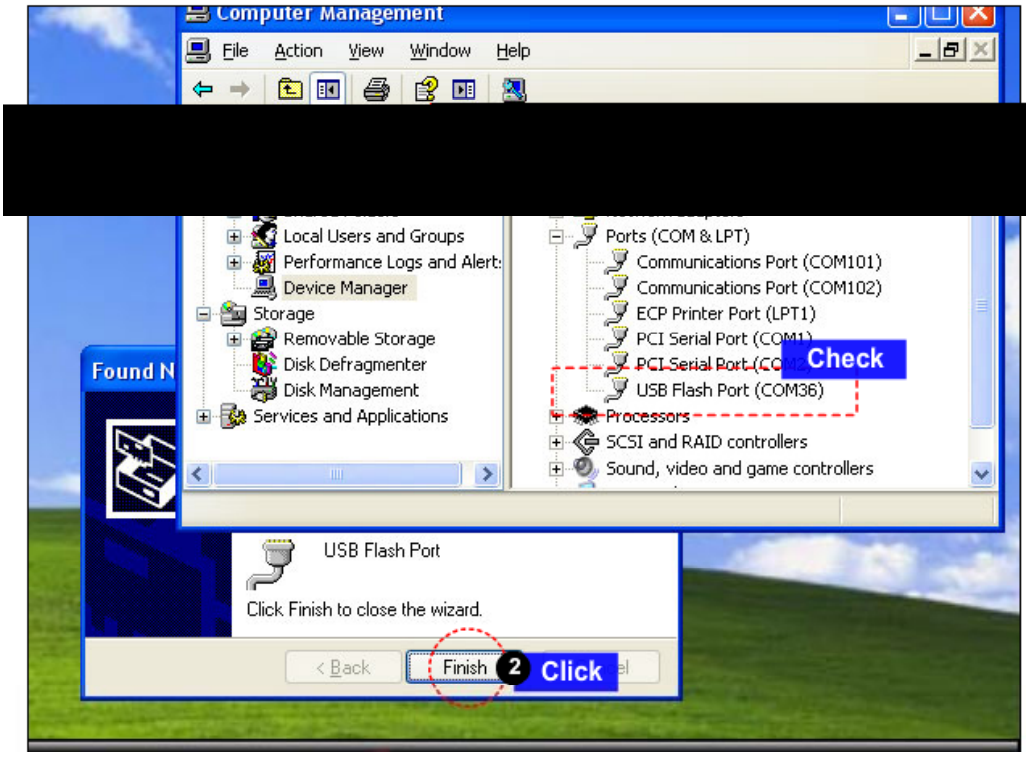


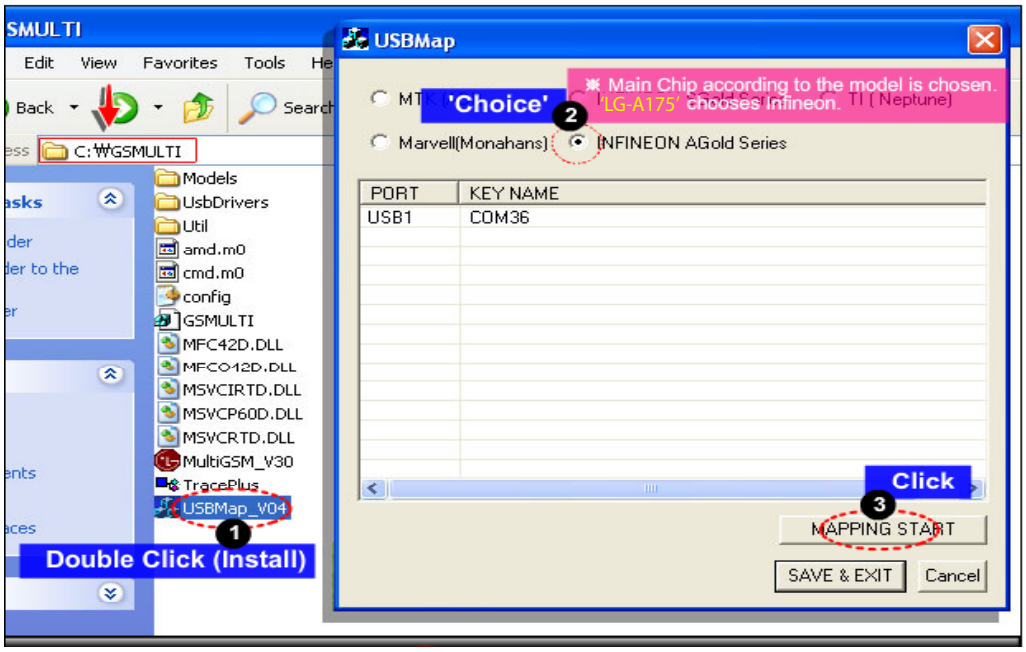


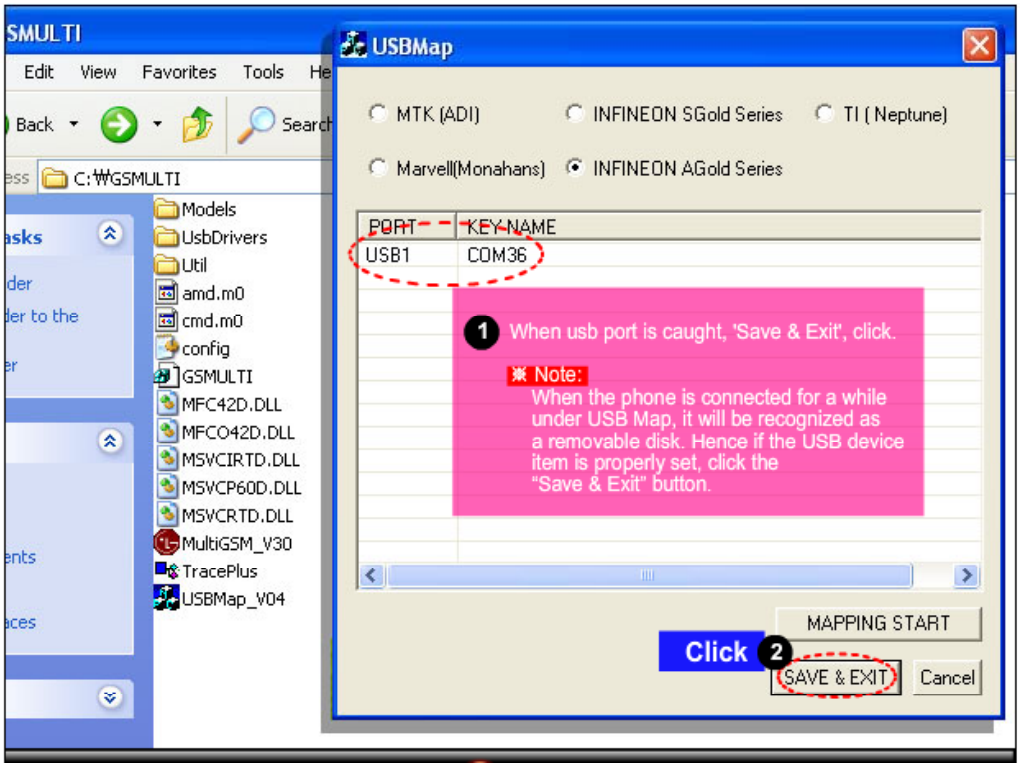


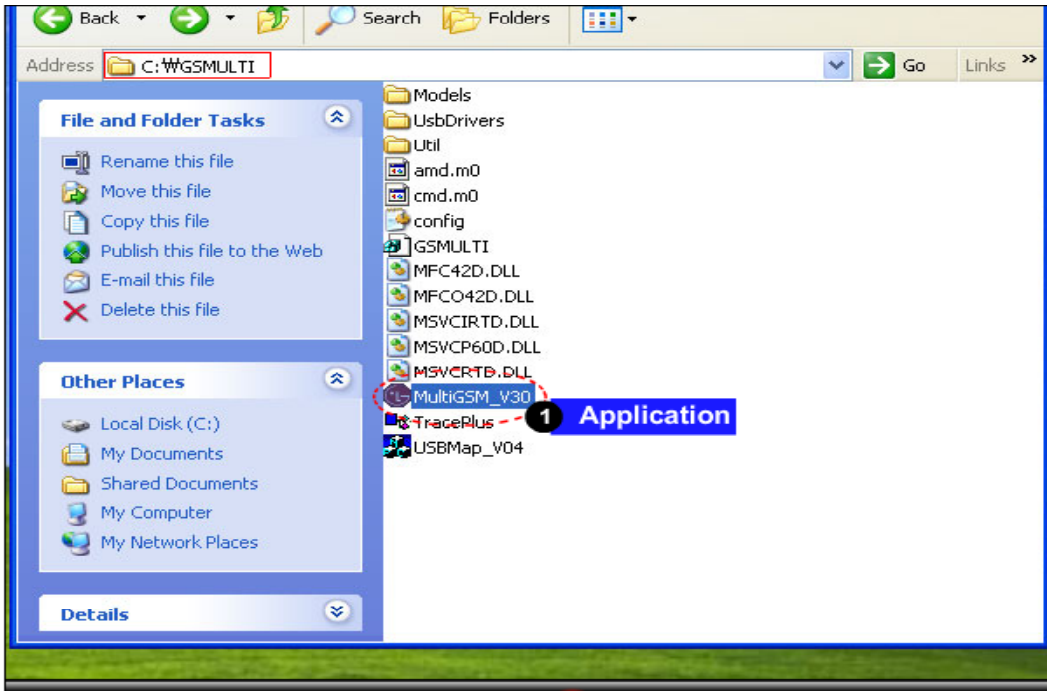


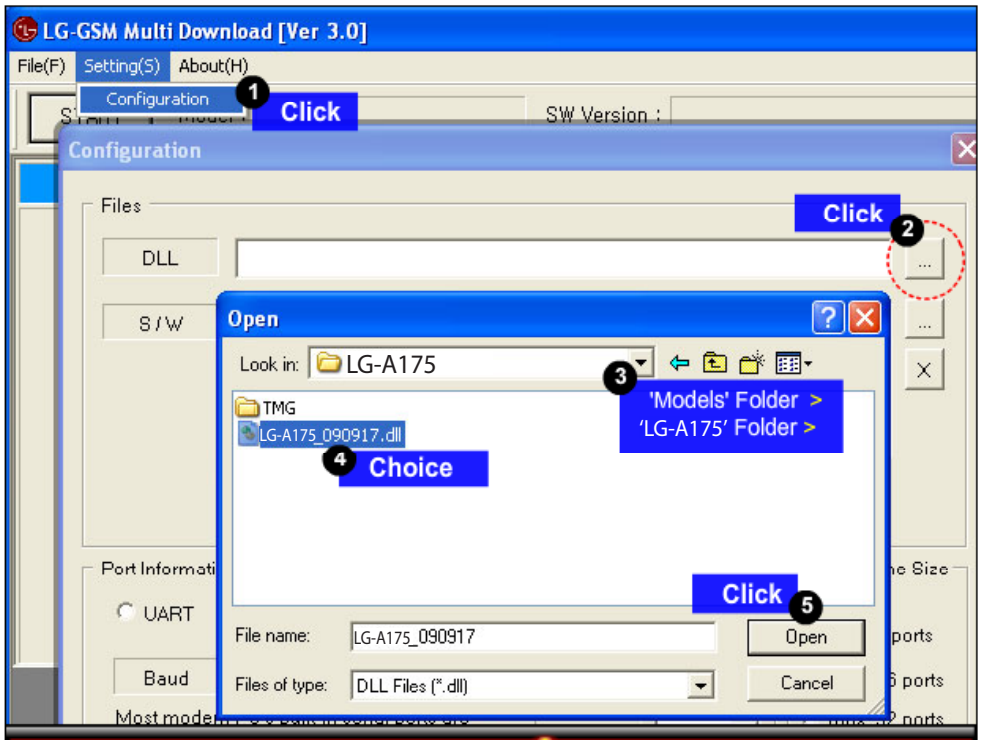


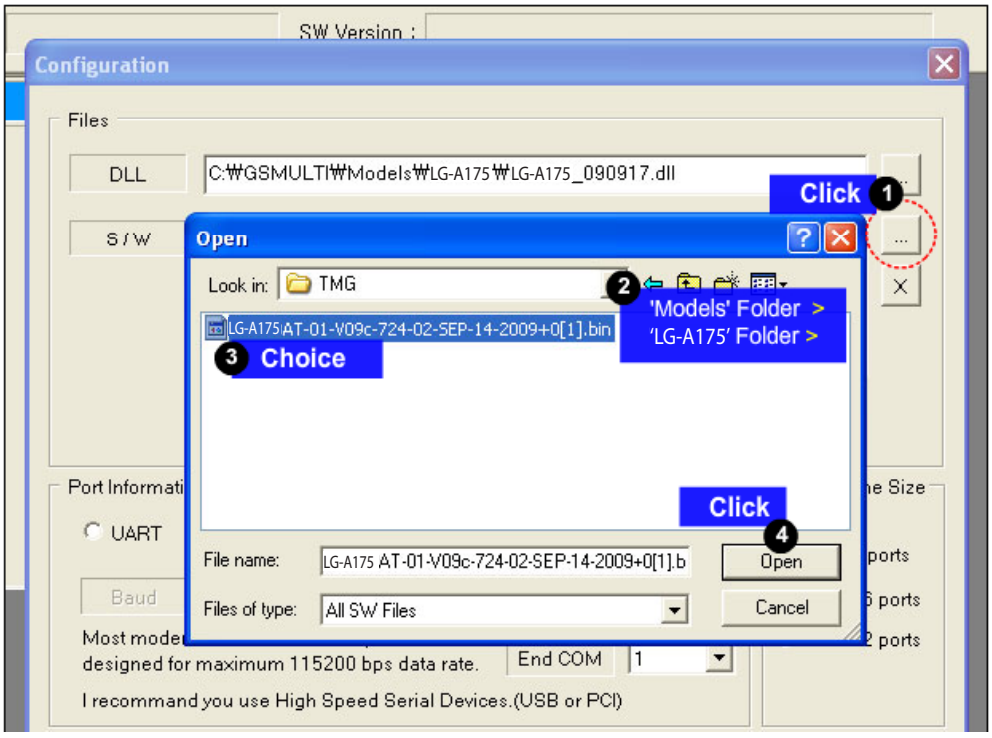


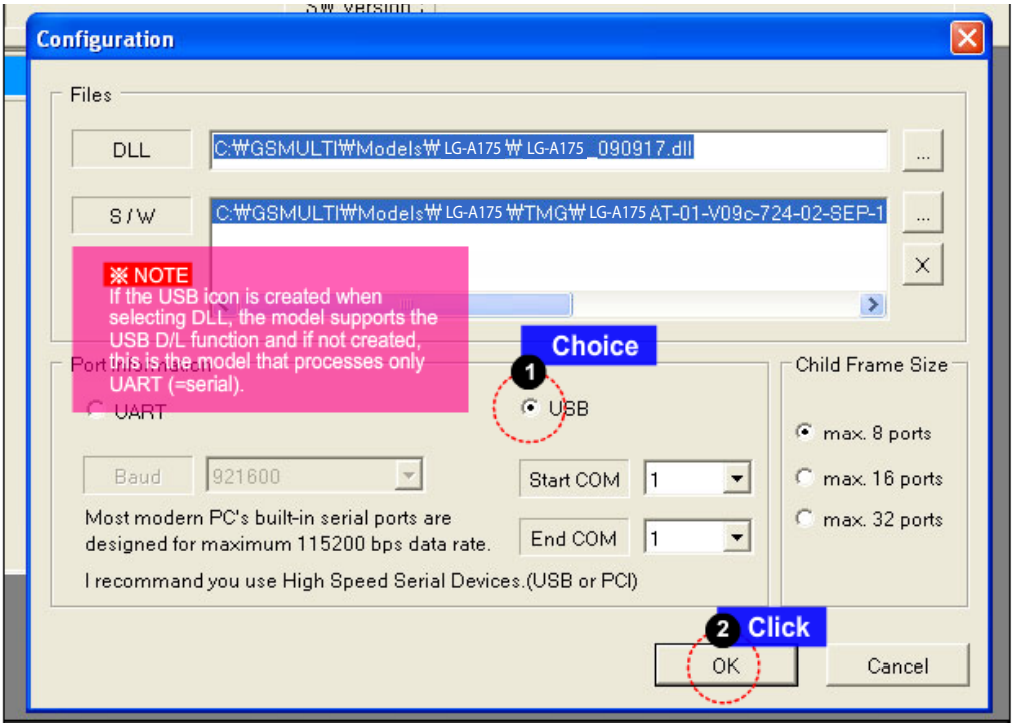


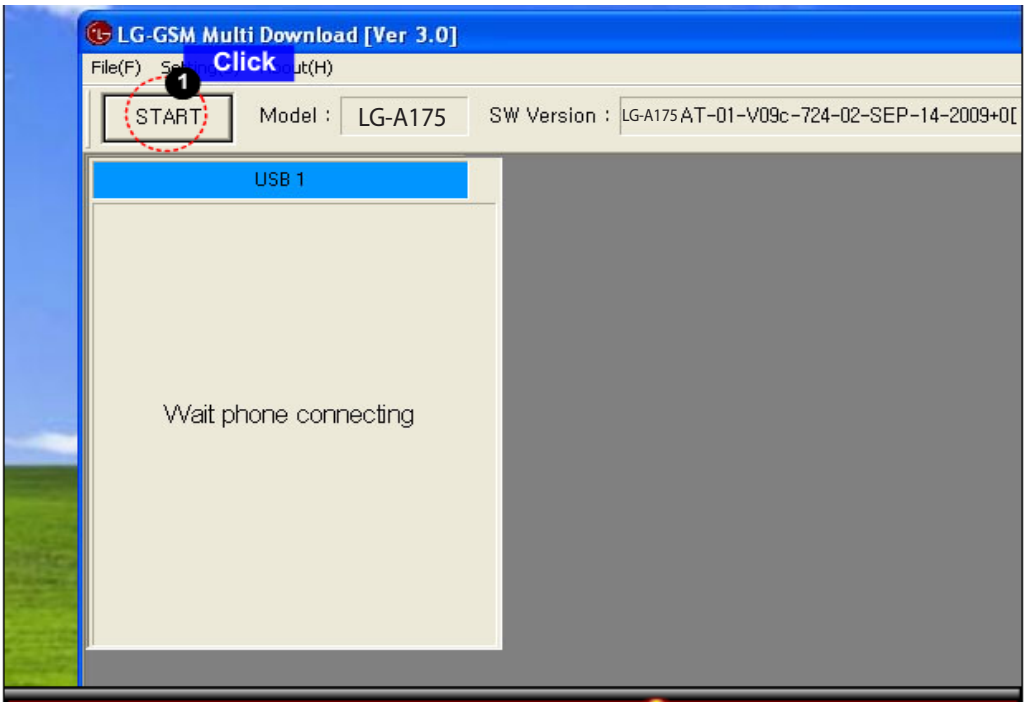


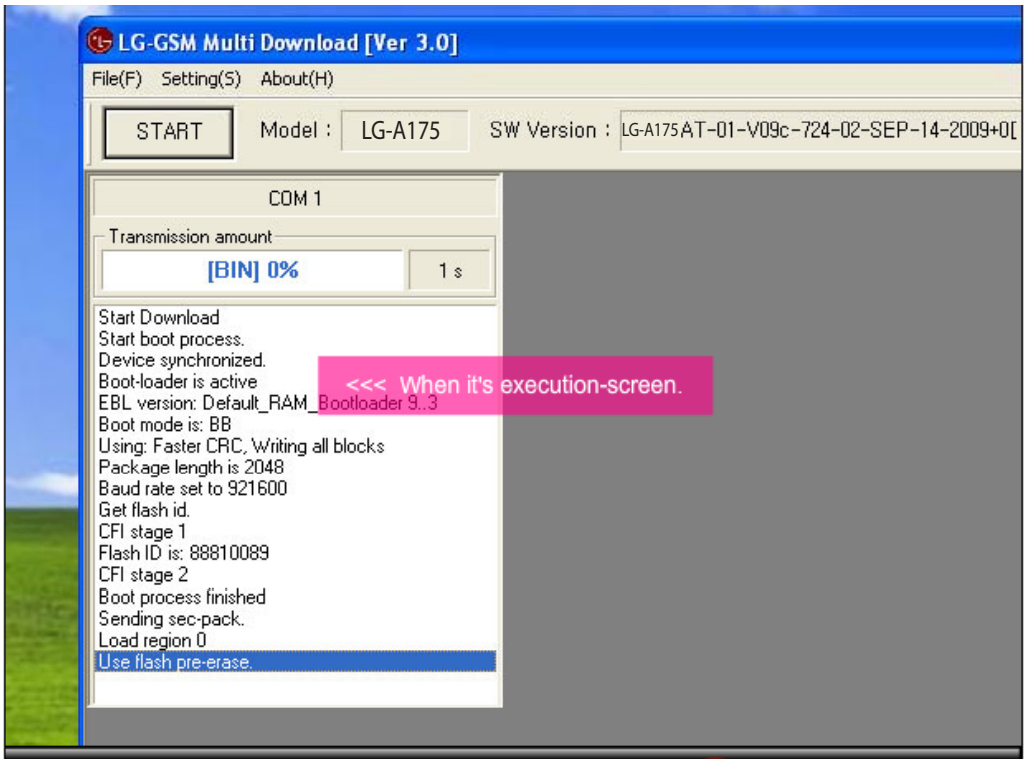


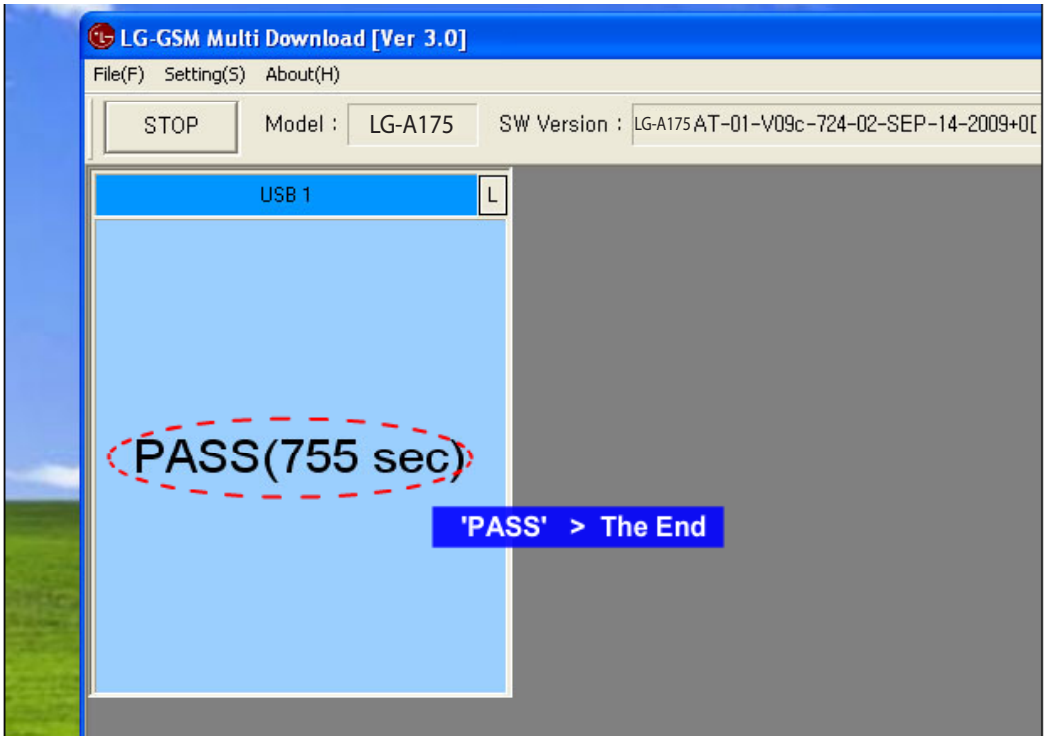




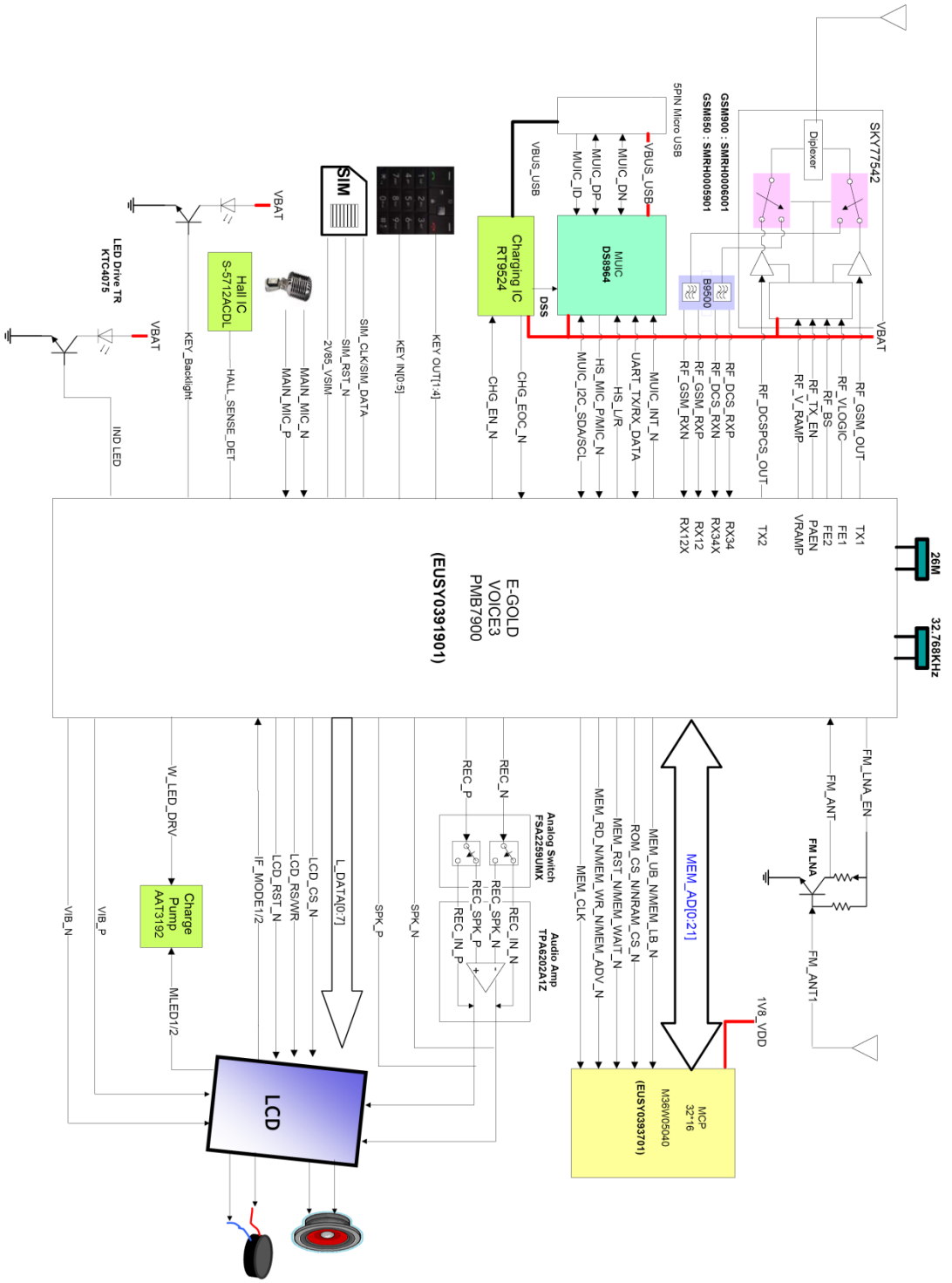




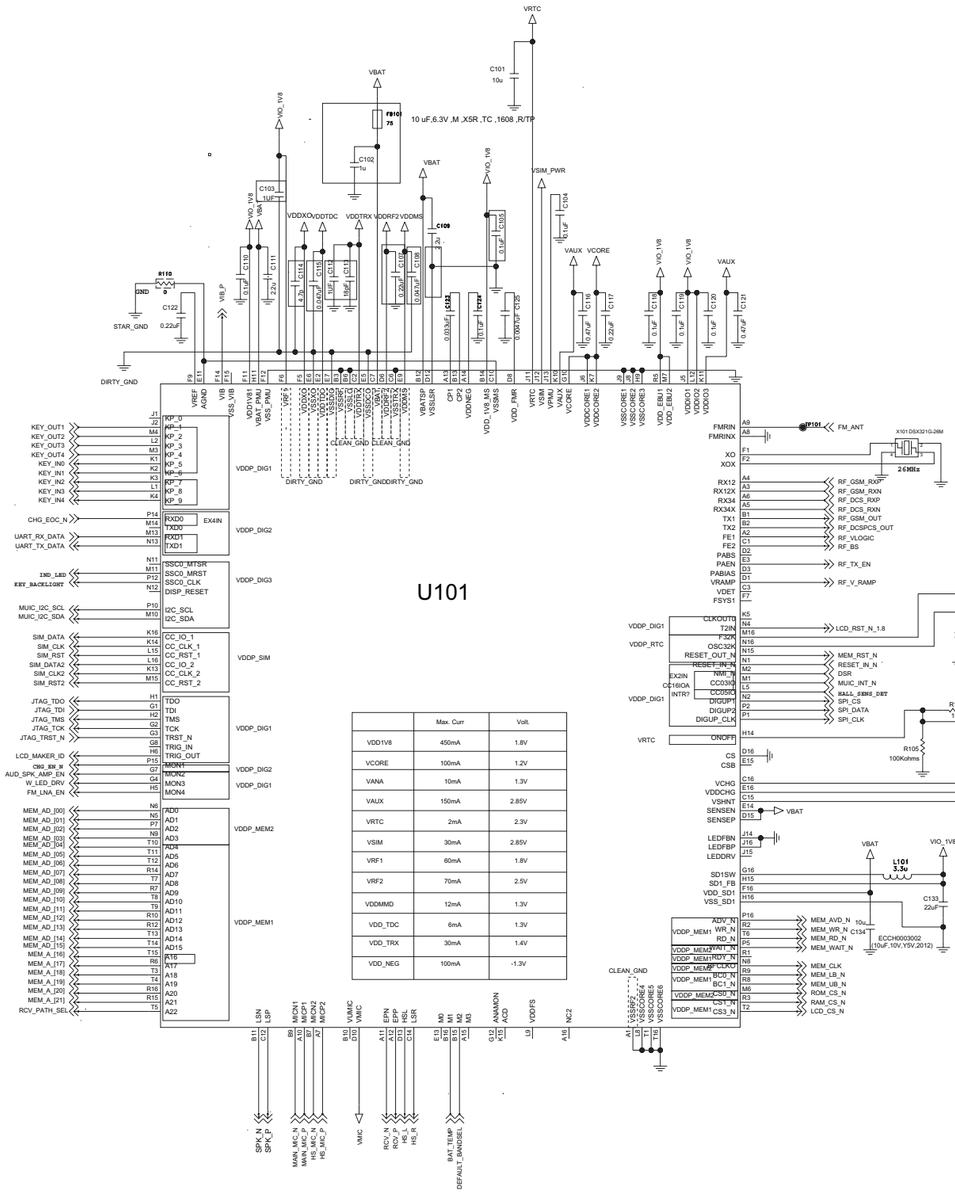




6.Block diagram



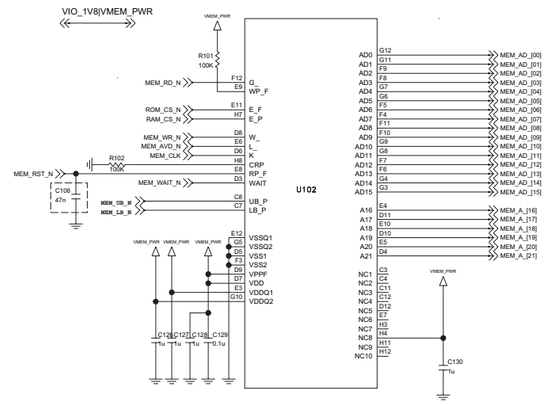
7. CIRCUIT DIAGRAM

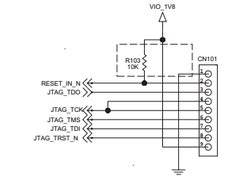


U101

	Max. Curr	Volt.
VDD1V8	450mA	1.8V
VCORE	100mA	1.2V
VANA	10mA	1.3V
VAUX	150mA	2.85V
VRTC	2mA	2.3V
VSIM	30mA	2.85V
VRF1	60mA	1.8V
VRF2	70mA	2.5V
VDDMMD	12mA	1.3V
VDD_TDC	6mA	1.3V
VDD_TRX	30mA	1.4V
VDD_NEG	100mA	-1.3V

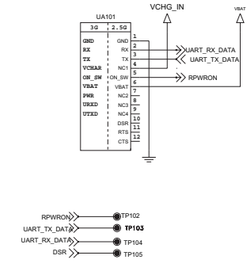
REMOTE POWER ON

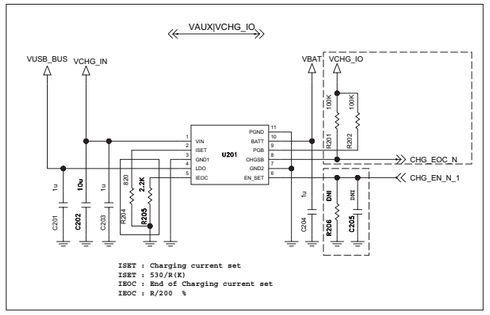


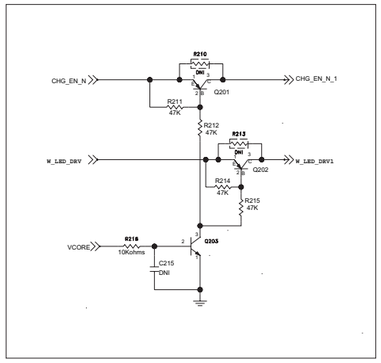


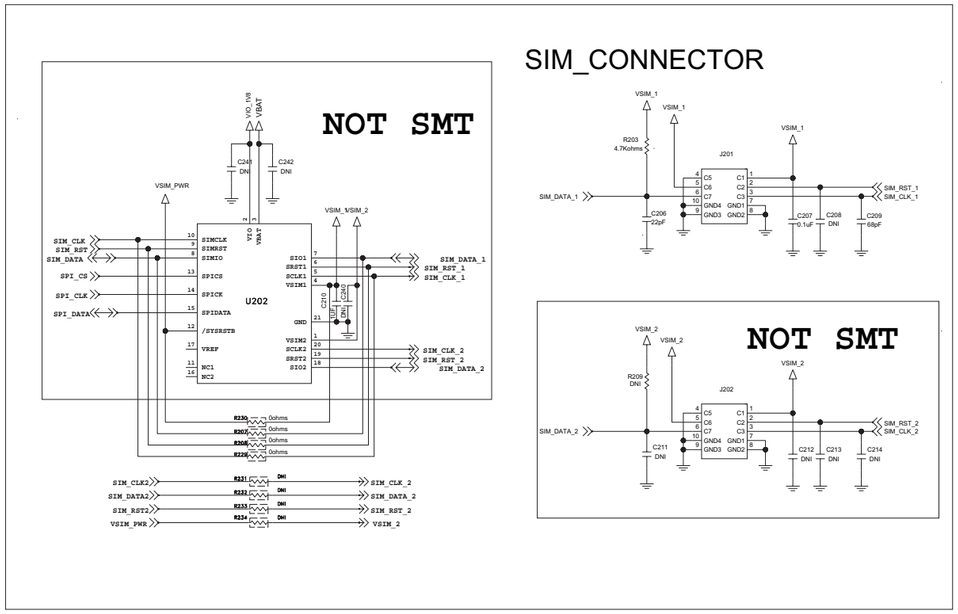
(NOT MOUNTED)
(FOR SW DEBUGGING / NOT MOUNTED)
ON BOARD ARM9 JTAG & ETM INTERFACE

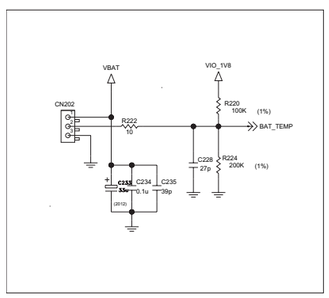
UART PORT

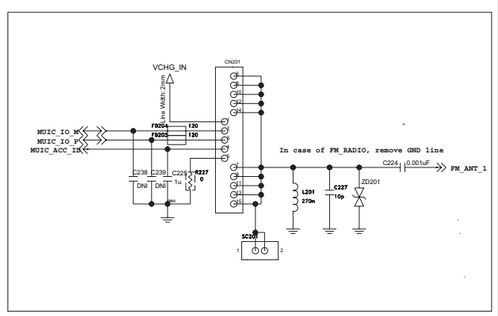


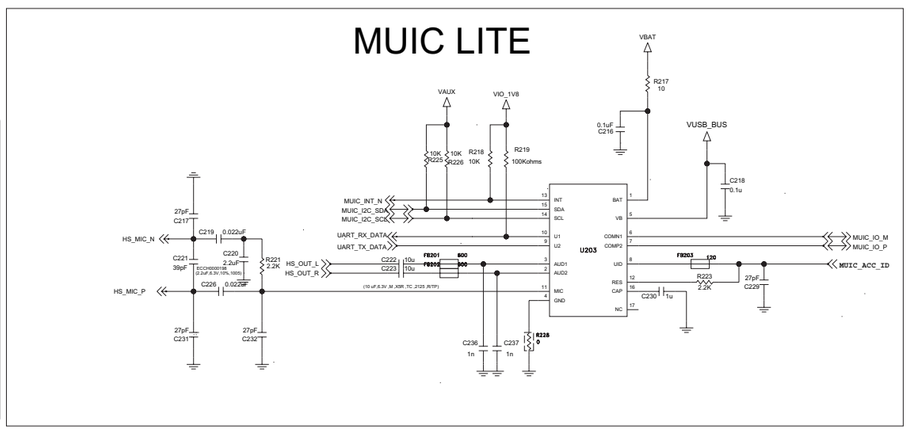




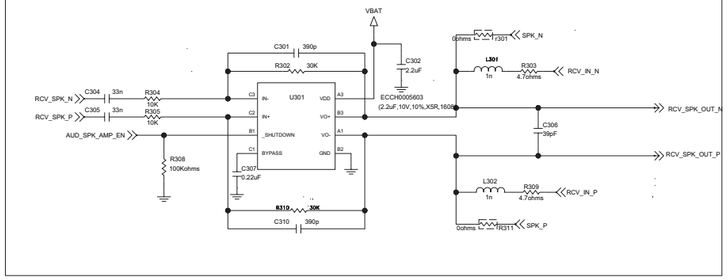






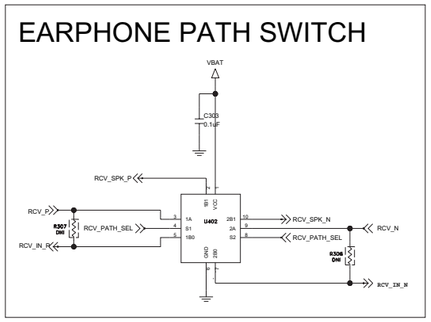


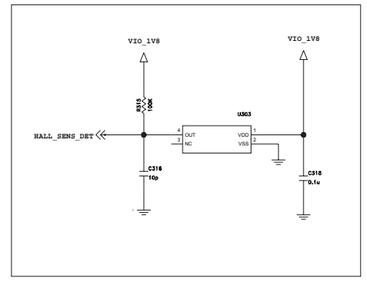
SPEAKER & RECEIVER



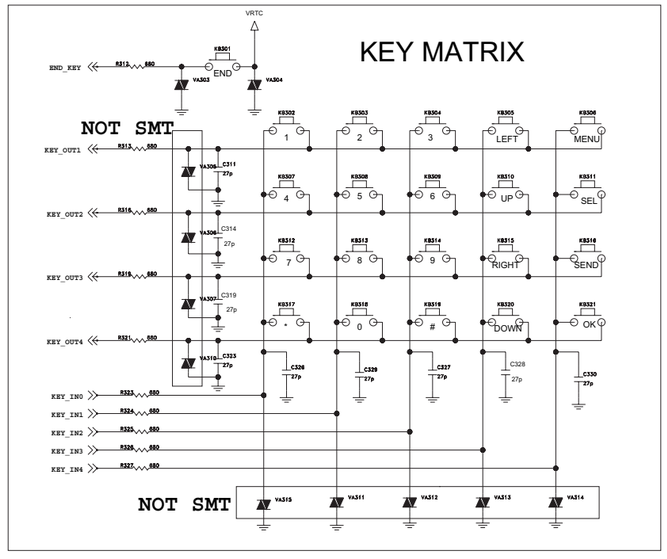
Headset Path

EARPHONE PATH SWITCH

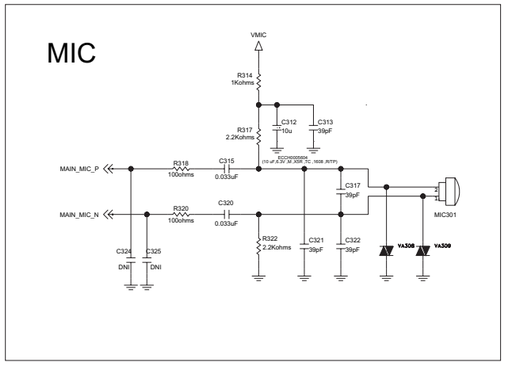




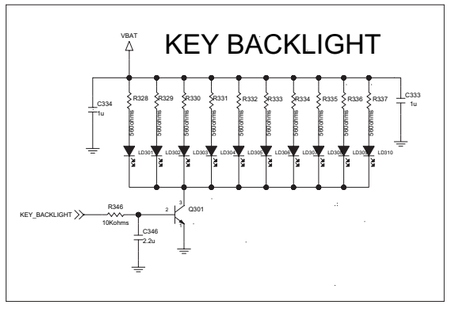
KEY MATRIX



MIC

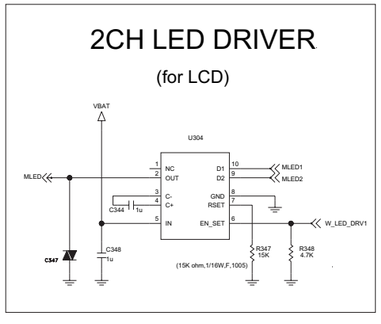


KEY BACKLIGHT

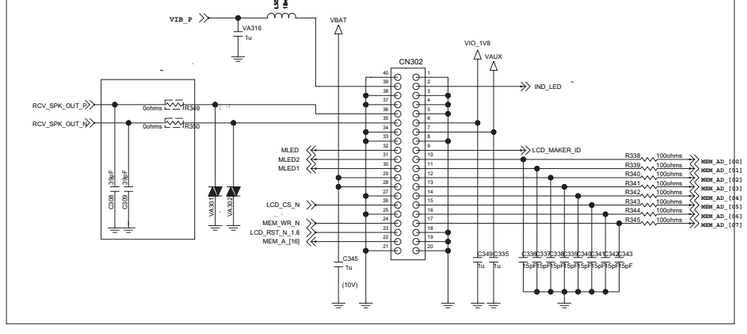


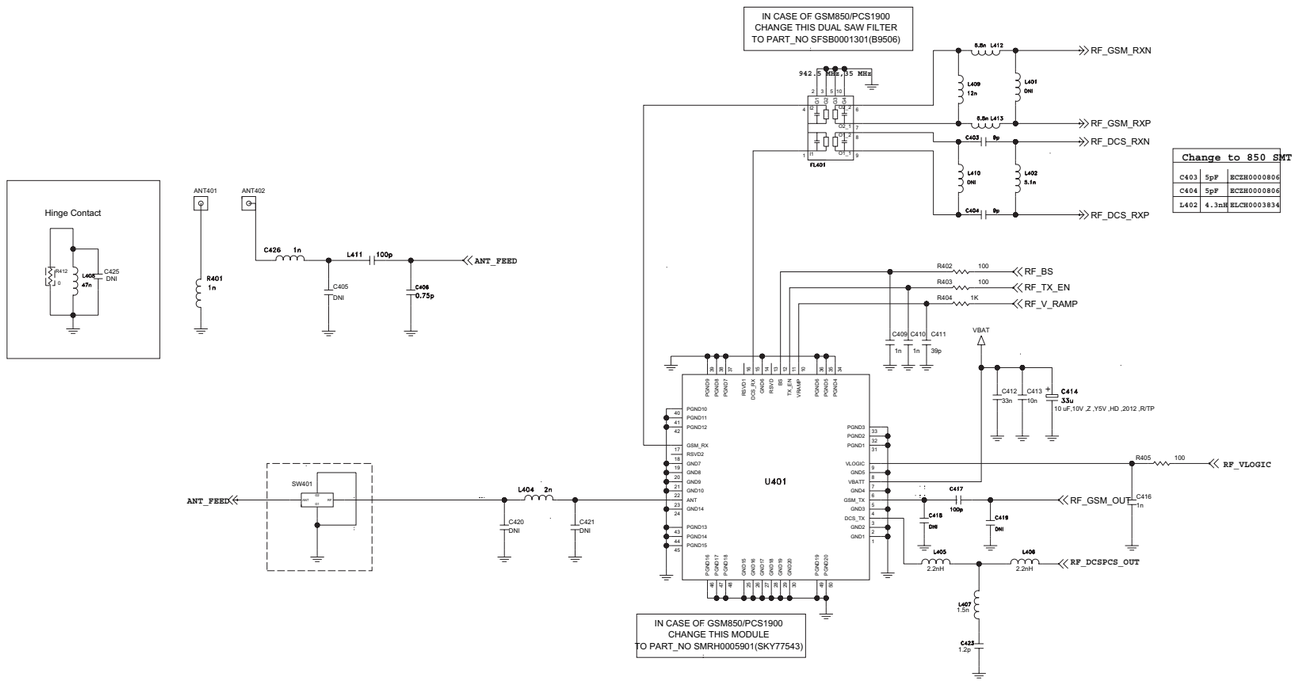
2CH LED DRIVER

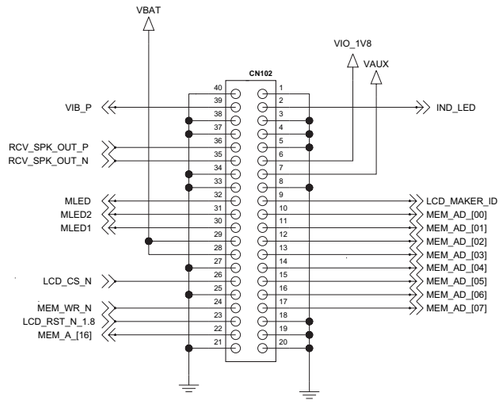
(for LCD)

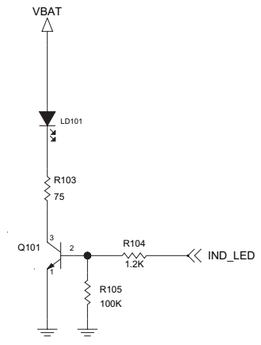


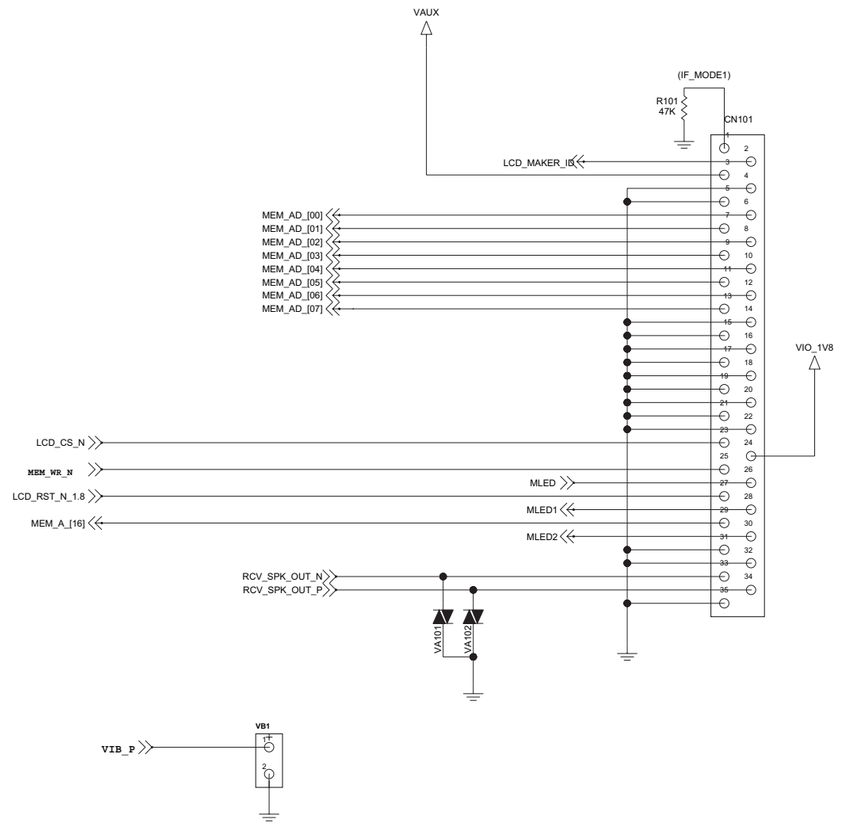
LCD Connector











8. BGA PIN MAP

8.1 BGA PIN MAP (Top View)

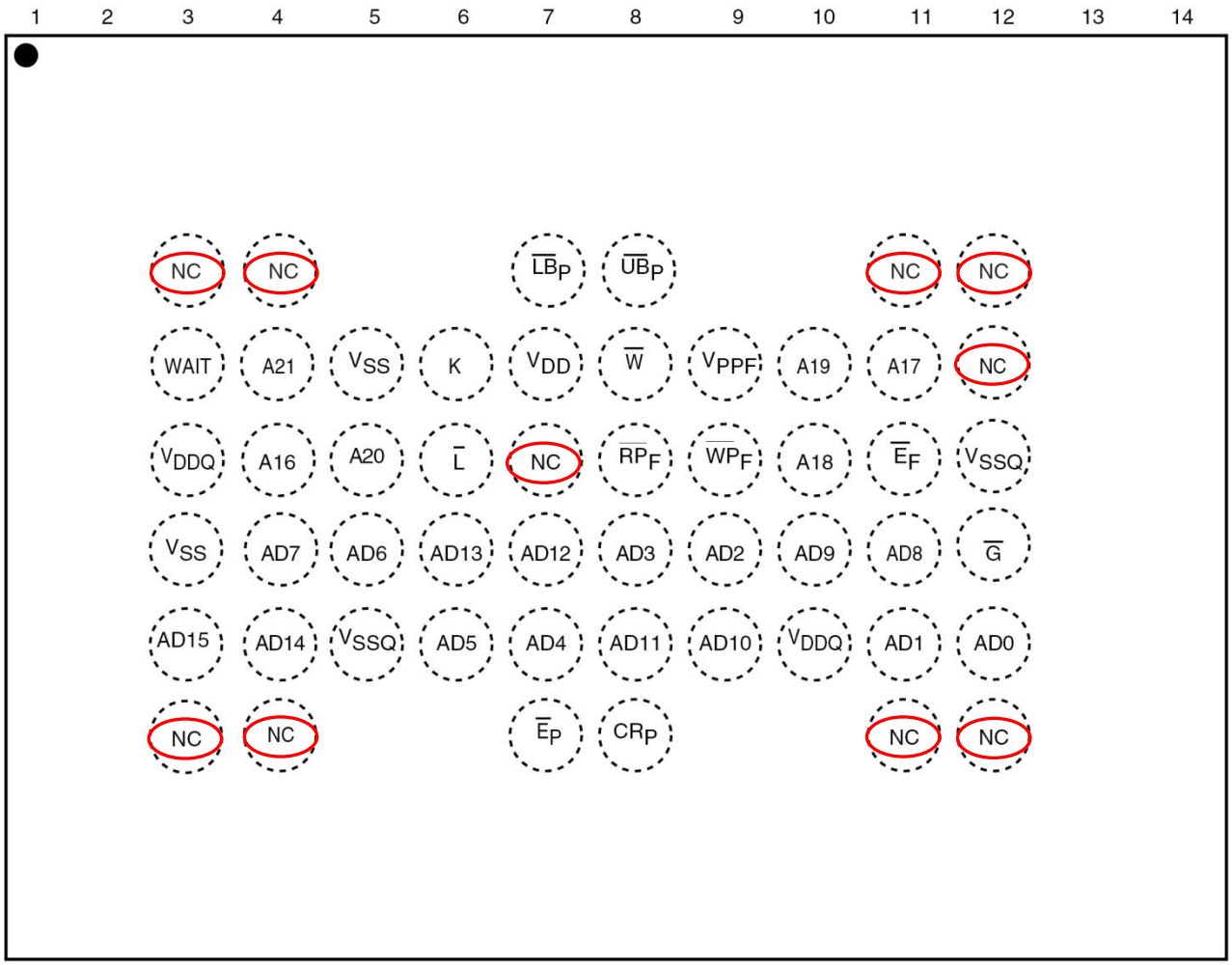
8.1.1 BGA IC pin check (U101)

▪ **Ball Diagram (Top View), PMB7900(E-GOLDVoice 3)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
A	VSSRF2	FE1	RX12X	RX12	RX34X	RX34	MICP2	FMRINX	FMRIN	MICP1	EPN	EPP	CP1	VDDNEG	M3	NC2	A
B	TX1	TX2	VSSRF			VSSLO	MICN2		MICN1	VUMIC	LSN	VBATSP	CP2	VDD_1V8_MS	M2	M1	B
C	FE2	VDDTRX	VDET			VSSTRX	VBAT			VSSMS		LSP		HSR	VSHNT	VCHG	C
D	VRAMP	PABS	PABIAS			VDDRF2		VDD_FMR		VMIC		VSSLSR	HSL		SENSEP	CS	D
E		VDDTDC	PAEN		VSSDCO	VSSXO	VSSDIG		VDDMS		AGND		M0	SENSEN	CSB	VDDCHG	E
F	XO	XOX			VDDXO	VRF1	FSYS1		VREF		VDD1V81	VSS_PMU		VIB	VSS_VIB	VDD_SD1	F
G	TDI	TCK	TRST_N	MON3			MON2	TRIG_IN		VCORE		ANAMON				SD1SW	G
H	TDO	TMS			MON4	TRIG_OUT			VSSCORE3		VBAT_PMU			ONOFF	SD1_FB	VSS_SD1	H
J	KP_0	KP_1			VDDIO1	VDDCORE1		VSSCORE2	VSSCORE1		VRTC	VSIM	VPMU	LEDFBN	LEDDRV	LEDFBP	J
K	KP_5	KP_6	KP_7	KP_9	CLKOUT0		VDDCORE2			VAUX	VDDIO3		CC_CLK_2	CC_CLK_1	ACD	CC_IO_1	K
L	KP_8	KP_3			CC05IO			VSSCORE4	VDDFS			VDDIO2			CC_RST_1	CC_IO_2	L
M	CC03IO	NMI_N	KP_4	KP_2		CS0_N	VDD_EBU2			I2C_SDA	SSC0_MRST		RXD1	TXD0	CC_RST_2	F32K	M
N	RESET_IN_N	DIGUP1		T2IN	AD1	AD0		BFCLKO	AD3		SSC0_MTSR	DISP_RESET	TXD1		RESET_OUT_N	OSC32K	N
P	DIGUP_CLK	DIGUP2			WAIT_N		AD2			I2C_SCL		SSC0_CLK		RXD0	MON1	ADV_N	P
R	RDY_N	WR_N	CS1_N		VDD_EBU1	A17	AD9	BC1_N	BC0_N	AD12		AD13		AD7	A21	A20	R
T	VSSCORE5	CS3_N	A18	A19	A22	RD_N	AD8	AD10	AD11	AD4	AD5	AD6	AD14	AD15	A16	VSSCORE6	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	

8.1.2 BGA IC pin check (U102)

▪ **Ball Diagram (Top View),**

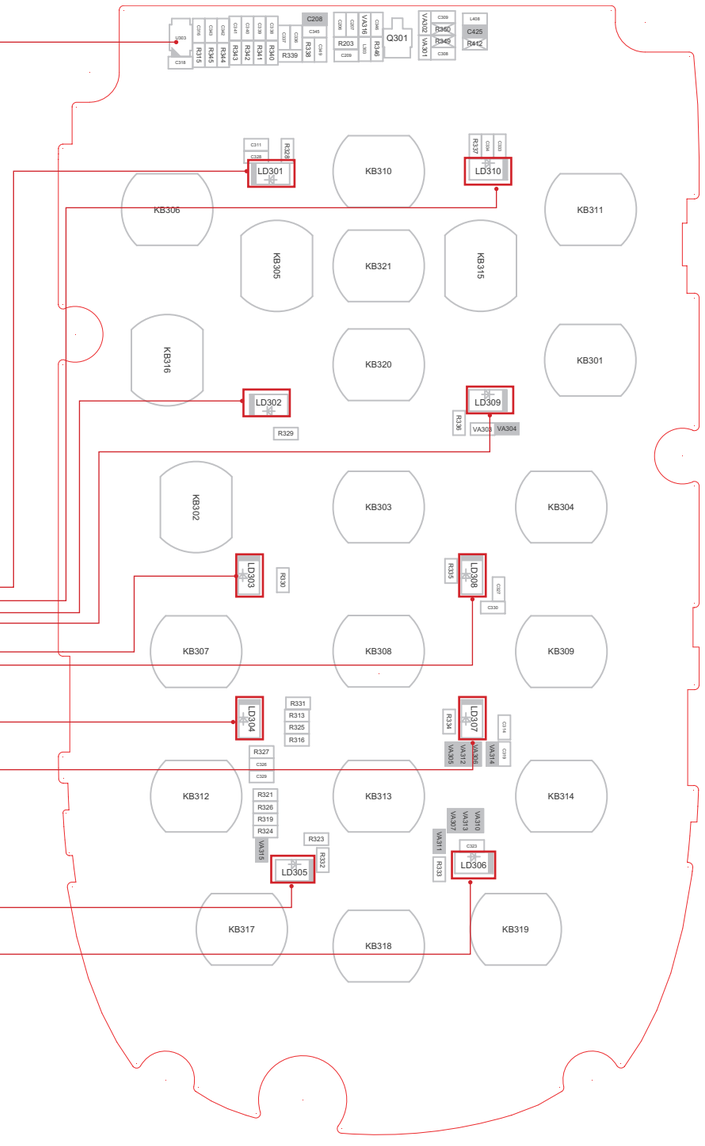


9. PCB LAYOUT

Main PCB LAYOUT

U303(Hall Sensor)
- No Slide on off.

LD301 ~ LD310 (LED)
- No LED ON.



CN202 (Battery Connector)
- No charging
- No power on

CN 302
-No Display
-No Sound
-No Vibration

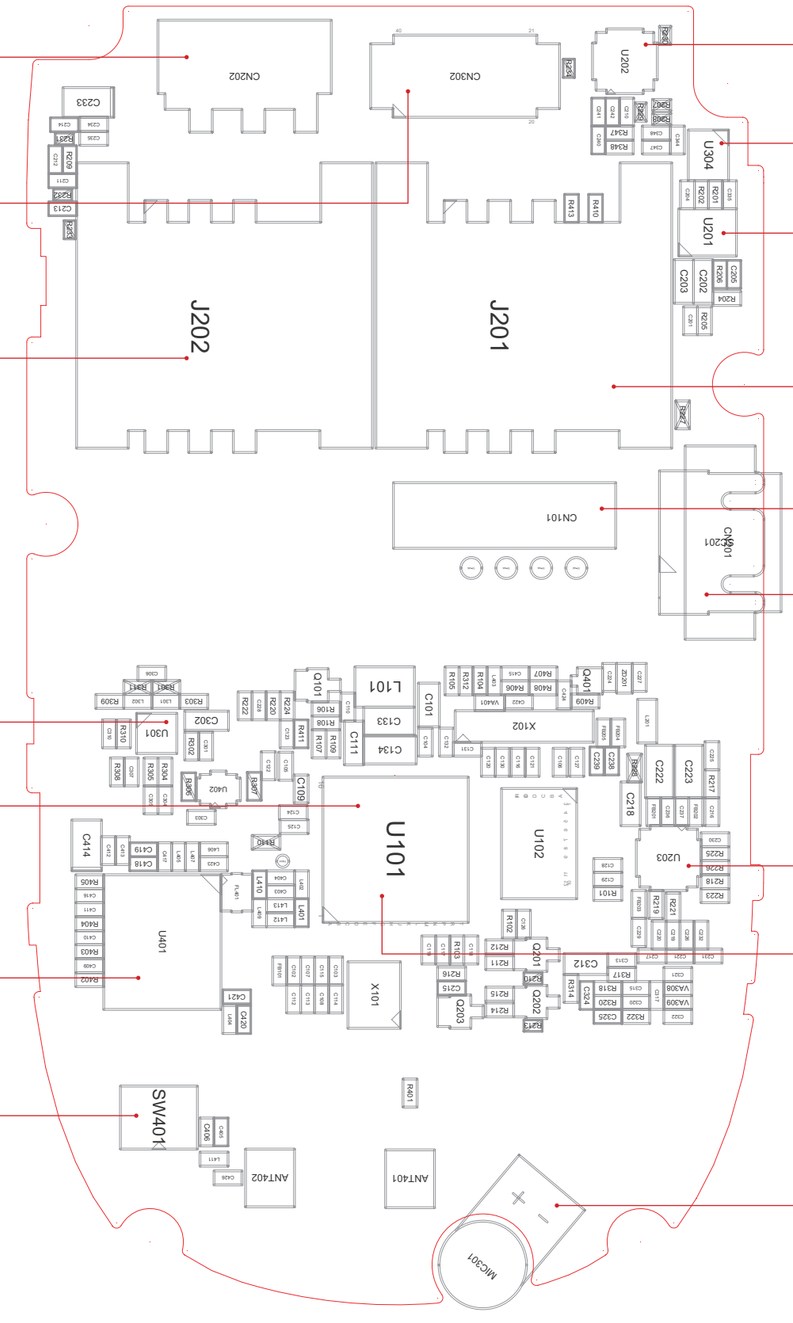
J202
-Do Not Insert

U301(Audio Amp)
-No SPK Sound

U100 (Main BB)
-No operating almost all functions

U300 (Tx Module)
- Can't make a call
- Tx Low power
- Not good BER
- No Service

SW401(mobile switch)
- Can't make a call
-Tx Low power
- Not good BER
- No Service



U202
-Do Not Insert

U304 (Charge Pump)
-No LCD Backlight

U201(charge IC)
- No Charging

J201(SIM Con.)
-SIM Detecting/working bad

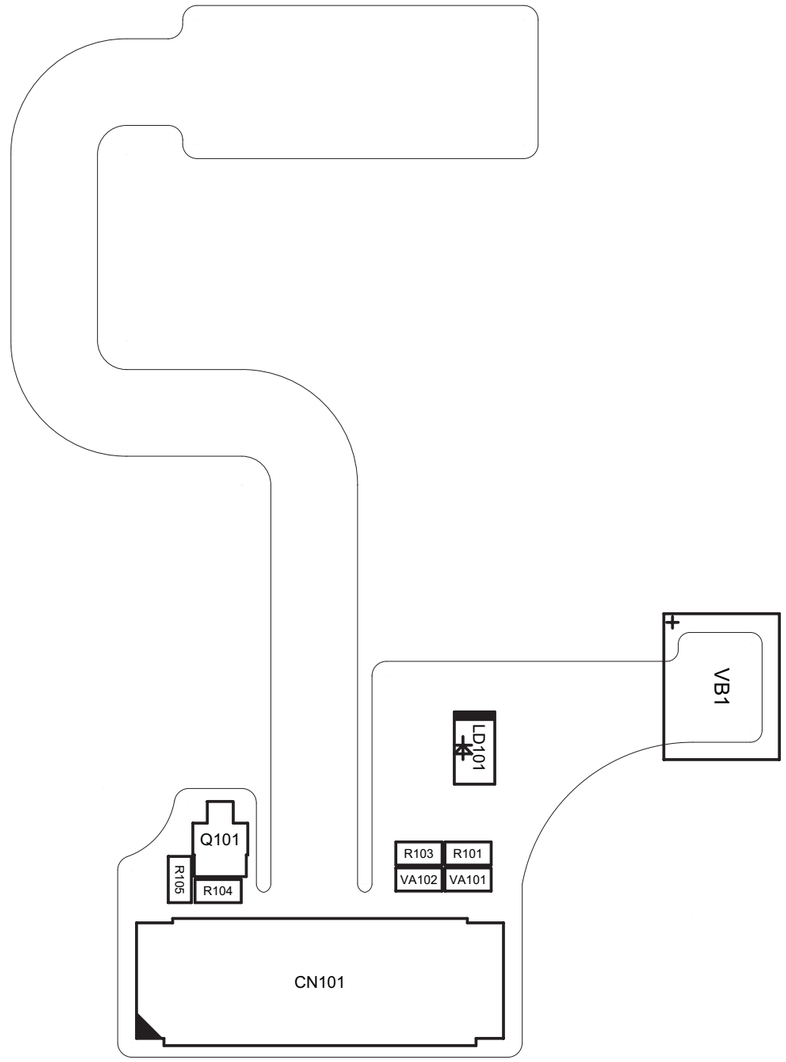
CN101(J-Tag Con.)
-SIM Detecting/working bad

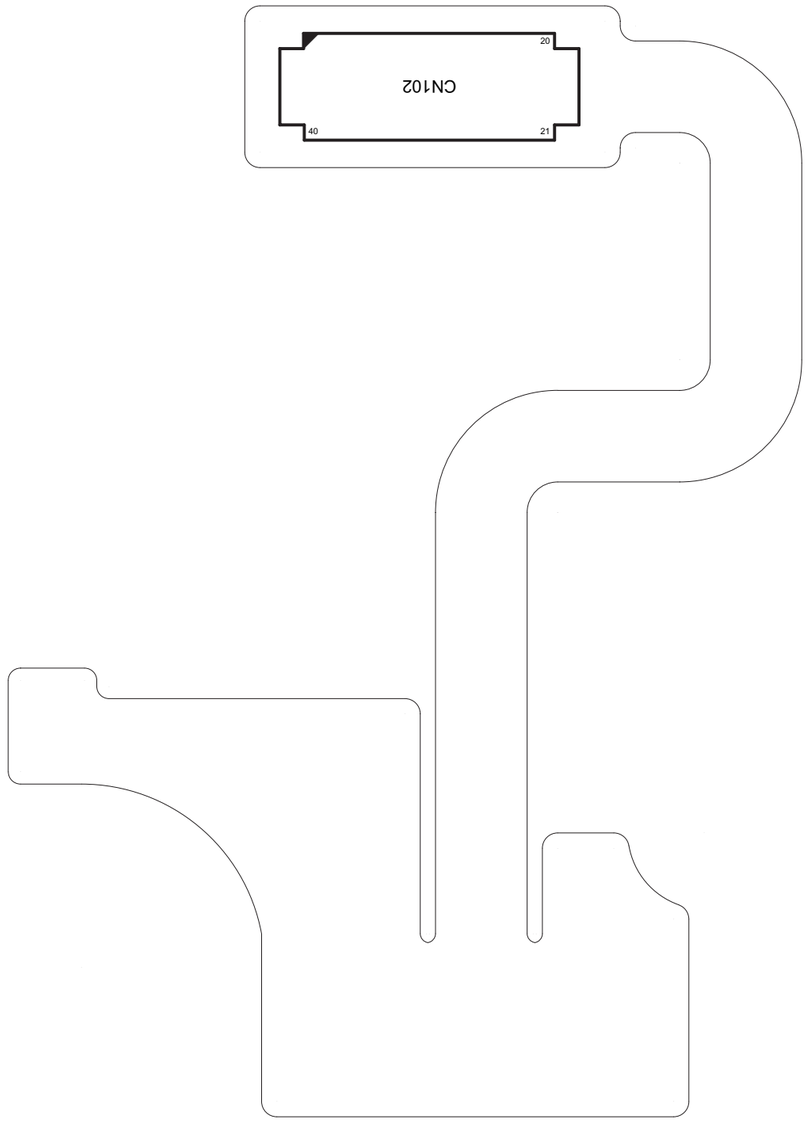
CN201(IO Con.)
-No Charging
-No Ear_Mic operation
--No Download

U203 (MUIC)
-No Earphone
-No Download

U102
-No booting

MIC301(C-MIC)
- Mute Sending volume





10. ENGINEERING MODE

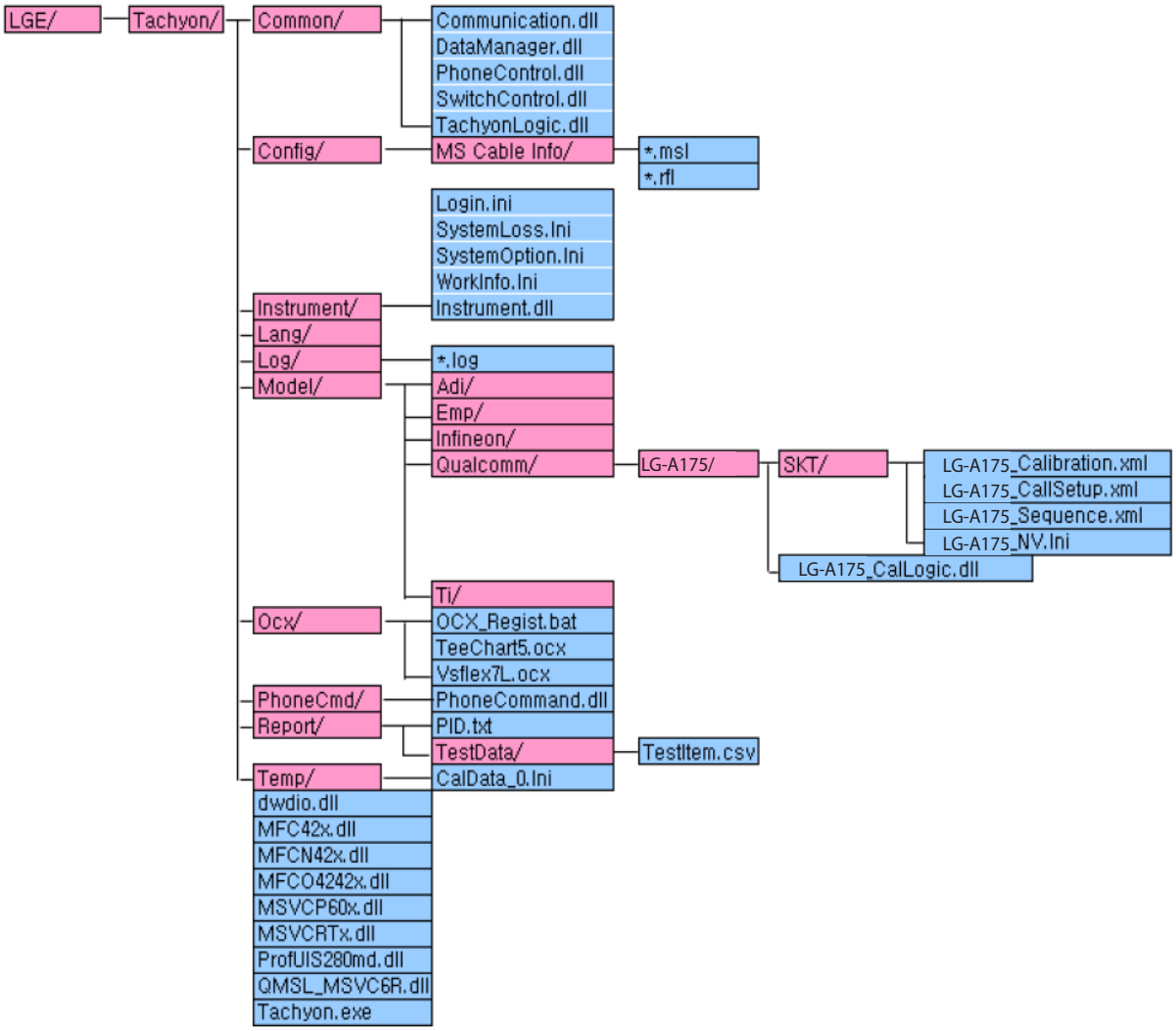
Engineering mode is designed to allow a service man/engineer to view and test the basic functions provided by a handset. The key sequence for switching the engineering mode on is "1809#*175# "Select. Pressing END will switch back to non-engineering mode operation. Use Up and Down key to select a menu and press 'select' key to progress the test. Pressing 'back key will switch back to the original test menu.

11. AUTO CALIBRATION

11.1 Overview

Auto-cal (Auto Calibration) is the PC side Calibration tool that perform Tx, Rx and Battery Calibration with Agilent 8960(GSM call setting instrument) and Tektronix PS2521G(Programmable Power supply).
Auto-cal generates calibration data by communicating with phone and measuring equipment then write it into calibration data block of flash memory in GSM phone.

11.2 Configuration of Tachyon



11.3 Description of Basic File.

1. Common
- -. Comunication_006.dll
- -. CurrentTest_007.dll
- -. DataManager_019.dll
- -. PhoneControl_010.dll
- -. SwitchControl_005
- -. TachyonLogic_55.dll
- -. UsbTestDLL.dll

2. Config
- -. MS Cable Info -*.msl
  *.rfl

3. Instrument
- **-**. Instrument_037.dll

4. Lang
- -. ResEng_015.dll
- -. ResKor_015.dll

5. Log
- -. *.log

6. Model

-. LGA170A
- –. CLR
  - dwdio_001.dll
  - LGA170A_CalLogic_002.dll
  - xmm1100_eep022.cfg
- -. LGA170A_Calibration_002.xml
- LGA170A_CallSetup_001.xml
- LGA170A_Sequence_002.xml

-. LGA170A
- –. CLR
  - dwdio_001.dll
  - LGA170B_CalLogic_002.dll
  - xmm1100_eep022.cfg
- -. LGA170B_Calibration_003.xml
- LGA170B_CallSetup_001.xml
- LGA170B_Sequence_003.xml

7. OCX
- -. OCX_Regist.bat
- -. TeeChart5.ocx
- -. UCPRIVATEMQ.OCX
- -. Vsflex7L.ocx

8. PhoneCmd
- -. dwdio.dll
- -. PhoneCommand_045.dll
- -. QMSL_MSVC9R_Old.dll

9. Utilities

-. Stiletto
-. XEditorfile
-. AuthorityChange_008.exe
-. Hecaton.exe
-. MakeNVFile.exe
-. NV Manager.exe
-. PIF200.exe
-. sqlnet.log
-. Standard.Ini
-. WorkOrderManager_001.exe
-. XEditor_002.exe

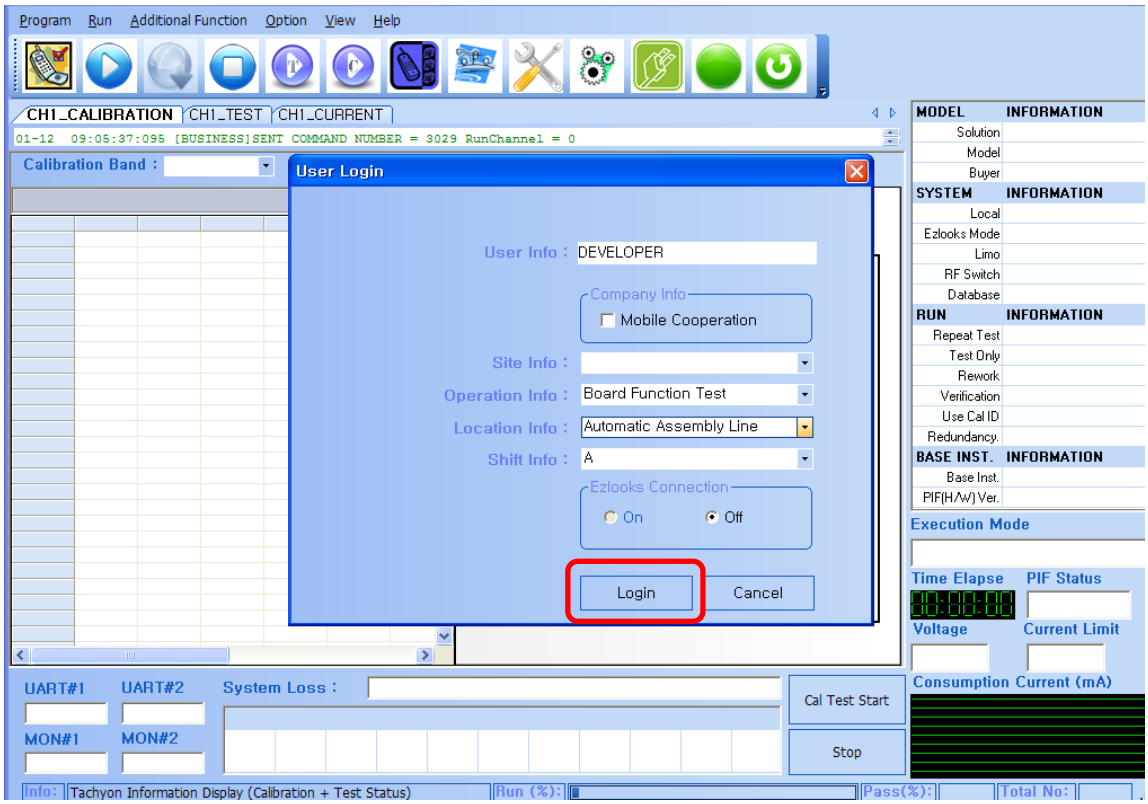
11.4 Procedure

1. Install Tachyon_setup_Kor_20090326.exe or Tachyon_setup_Eng_20090326.exe

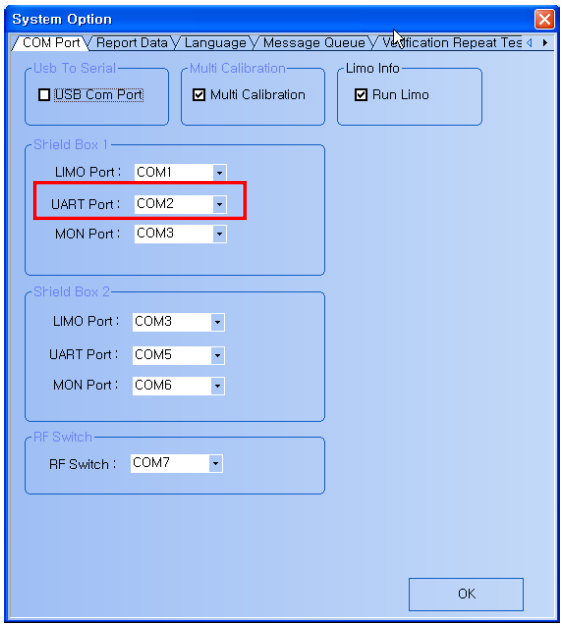
2. Copy the files of Tachyon_Release_20101012 to C:\LGE\Tachyon

3. Click on “Tachyon_029.exe”

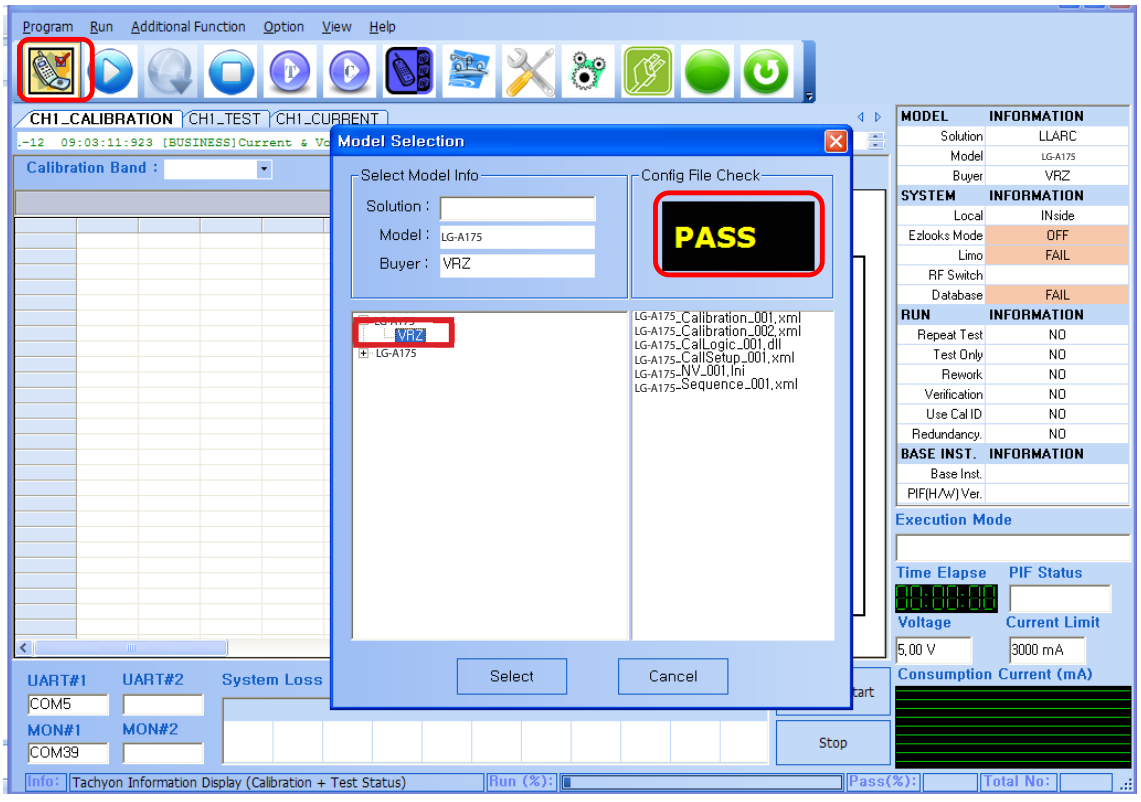
4. Click on “Login”



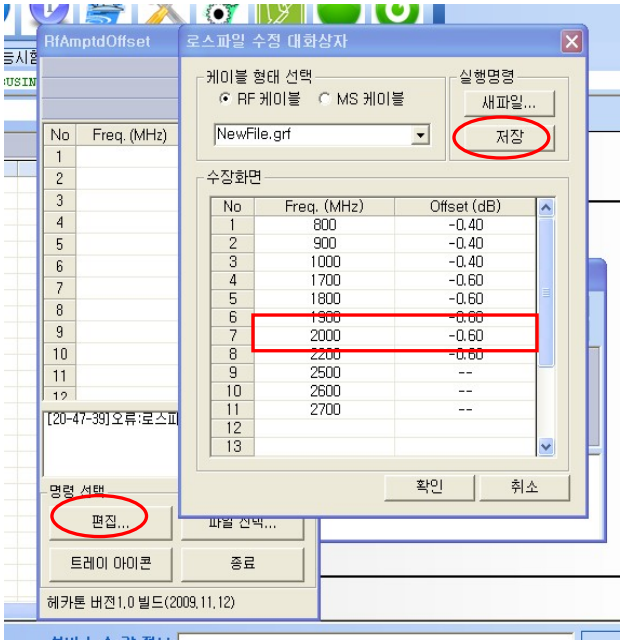
5. Click on Toolbar Icon
6. Set PORT (using RS232 cable) that PC can communicate with the phone



6. Click on “Model Seletion”
7. Click on “LGA170” => “CLR” => Check D splay “PASS” => “OK”



9. Click on Toolbar Icon 
10. Input the RF Cable Loss



11. Click on Toolbar Icon  => Calibration & Test Start

11.5 AGC

This procedure is for Rx calibration.
In this procedure, We can get RSSI correction value. Set band EGSM and press Start button the result window will show correction values per every power level and gain code and the same measure is performed per every frequency.

11.6 APC

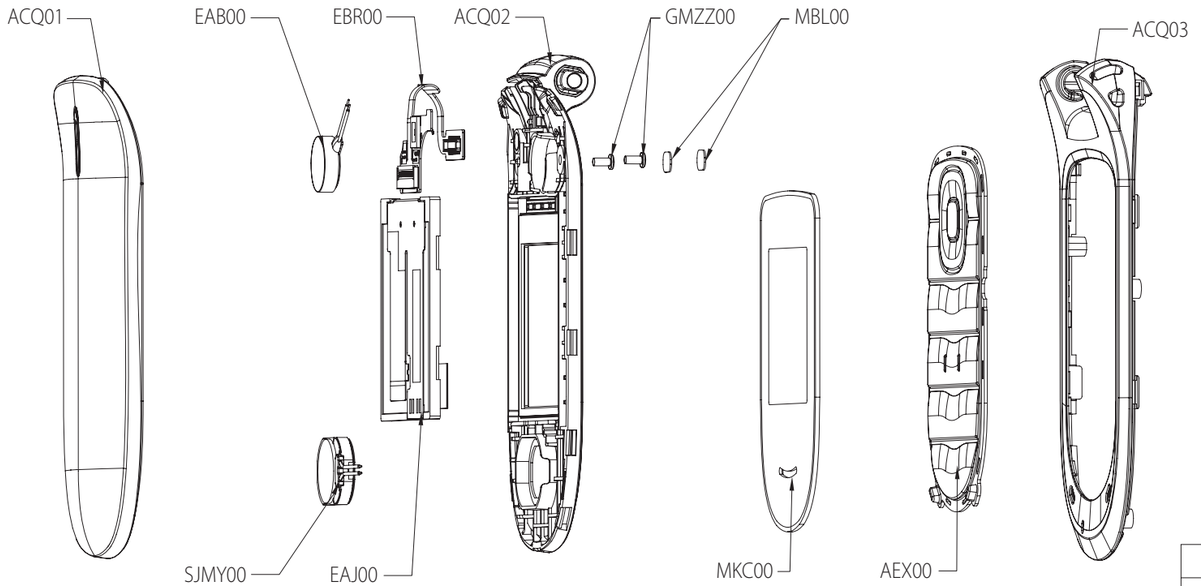
This procedure is for Tx calibration.
In this procedure you can get proper scale factor value and measured power level.

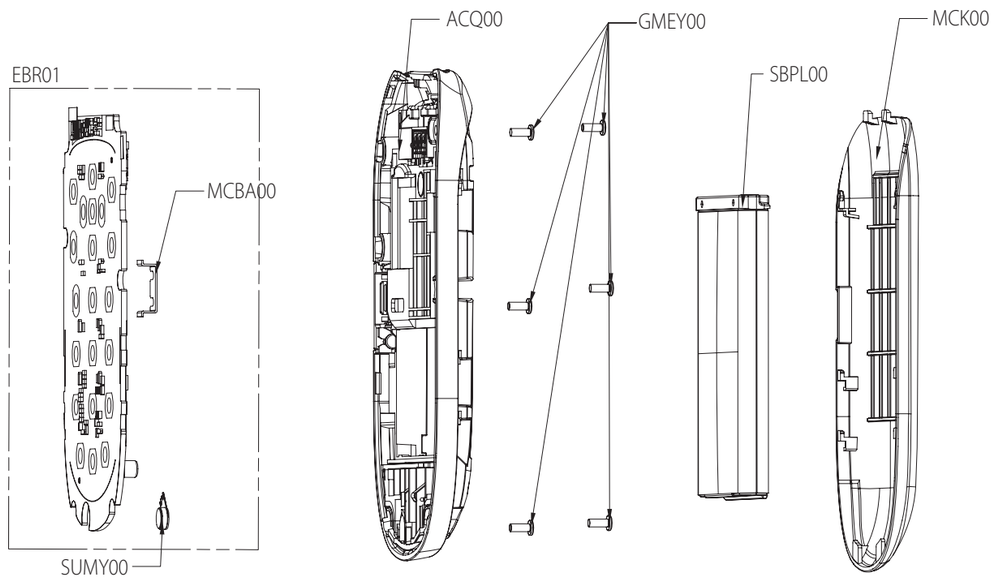
11.7 ADC

This procedure is for battery calibration.
You can get main Battery Config Table and temperature Config Table will be reset.

11.8 Target Power

BAND	Description	Low	Middle	High
GSM 850	Channel	128	191	251
	Frequency	824.2 MHz	836.8 MHz	848.8 MHz
	Max power	32.5 dBm	32.5 dBm	32.5 dBm
EGSM 900	Channel	975	37	124
	Frequency	880.2 MHz	897.4 MHz	914.8 MHz
	Max power	33 dBm	33 dBm	33 dBm
DCS1800	Channel	512	699	885
	Frequency	1710.2 MHz	1747.6 MHz	1784.8 MHz
	Max power	30 dBm	30 dBm	30 dBm
PCS 1900	Channel	512	661	810
	Frequency	1850.2 MHz	1880 MHz	1909.8 MHz
	Max power	29.5 dBm	29.5 dBm	29.5 dBm





Location	Description
ACQ00	Cover Assembly,Rear
EBR00	PCB Assembly,Flexible
EAJ00	LCD,Module-TFT
EAB00	Speaker,Dual Mode
AEX00	Keypad Assembly,Main
MKC00	Window,LCD
SJMY00	Motor,DC
ACQ01	Cover Assembly,Upper
ACQ02	Cover Assembly,Lower
ACQ03	Cover Assembly,Front
GMZZ00	Screw,Machine
MBL00	Cap,Screw
GMEY00	Screw,Machine
EBR01	PCB Assembly,Main
SUMY00	Microphone,Condenser
MCBA00	Can,Shield
MCK00	Cover,Battery
SBPL00	Mobile Phone Battery Li-Ion

12.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
1	AGQ000000	Phone Assembly	AGQ86446101	LGA175.ACISWR WR:WINE RED UADS is same as LGA170.AITAPW (APEY0994102)	
2	MEZ002100	Label, Approval	MLAA0062305	COMPLEX KB770 DEUBK ZZ:Without Color -	
2	ACQ100400	Cover Assembly, EMS	ACQ85529001	LGA175.ACISWR WR:WINE RED -	
3	ACQ00	Cover Assembly, Rear	ACQ85326601	LGA170.AGBRBK BK:Black -	
4	MCK063300	Cover, Rear	MCK66531801	MOLD PC LUPOY HP-5004 LGA170.AGBRBK BK:Black -	
4	MBL063800	Cap, Receptacle	MBL64818001	MOLD RUBBER LGA170.AGBRBK BK:Black -	
4	EAG020000	Connector, Terminal Block	ENZY0021201	KQ03LC-3R 3P 3.00MM ANGLE SMD R/TP - HIROSE KOREA CO., LTD	
4	EAA030100	PIFA Antenna, Multiple	EAA62465001	ACB-00100 DUAL -2DB 5 Metal Stamping Type - MOBITECH CORPORATION	
4	MCQ015700	Damper, Connector	MCQ66469301	COMPLEX LGA170.AGBRBK BK:Black -	
4	MCQ000000	Damper	MCQ66494101	COMPLEX LGA170.AGBRBK BK:Black -	
4	MEZ000900	Label, After Service	MLAB0001102	COMPLEX C2000 CGRSV WA:White C2000 USASV DIA 4.0 PRINTING,	
3	ACQ031100	Cover Assembly, Folder	ACQ85300106	LGA175.ACISWR WR:WINE RED -	
4	EBR00	PCB Assembly, Flexible	EBR73248801	LGA170.AITAPW 1.0 Flexible	
5	EBR070400	PCB Assembly, Flexible, SMT	EBR73248901	LGA170.AITAPW 1.0 Flexible	
6	EBR070200	PCB Assembly, Flexible, SMT Bottom	EBR73267901	LGA170.AITAPW 1.0 Flexible	
6	EAX010700	PCB, Flexible	EAX63985701	LGA170.AITAZY 1.0 POLYI Build-Up 4 0.35 FLEXIBLE	
6	EBR070300	PCB Assembly, Flexible, SMT Top	EBR73268001	LGA170.AITAPW 1.0 Flexible	
4	EAJ00	LCD, Module-TFT	EAJ61756101	TM015EDH02 SQQVGA 1.52INCH 128x128 250CD COLOR 50% 1/1 300:1 60Hz Inverter N - Shanghai Tianma Micro-Electronics Co., Ltd.	

Level	Location No.	Description	PartNumber	Spec	Remark
4	EAB00	Speaker, Dual Mode	EAB62288801	EMS1812TFR4P Nd-Fe-B 700mW 8OHM 91DB 710HZ 1812 3.0T wire 15mm DCCA WIRE EM-TECH	
4	AEX00	Keypad Assembly, Main	AEX73657703	LGA175.ACISWR WR:WINE RED Drawing is same as AEX73657701	
4	MKC00	Window, LCD	MKC63899602	CUTTING PMMA LGA175A.AVIVTS BK:Black Drawing is same as MKC63899601	
4	MEZ000000	Label	MLAZ0038303	COMPLEX LG-LC3200 WA:White PRINTING, PPRI PRINTING	
4	SJMY00	Motor, DC	SJMY0007108	WHVM-1030B10 WHVM-1030B10, 3 V, 80 mA, 10*3.0, 12mm SEOUNGHYUN SMT	
4	ACQ01	Cover Assembly, Upper	ACQ85299903	LGA175.ACISWR WR:WINE RED LGA170 WR:Wine Red Color (MCK66531103)	
5	MEV000000	Insulator	MEV63750701	COMPLEX LGA170.AITAPW PW:Pearl White -	
5	MES043800	Indicator, LED	MES62458801	COMPLEX LGA170.AGBRBK BK:Black -	
5	MDS000000	Gasket	MDS63650301	COMPLEX LGA170.AITAPW ZZ:Without Color -	
5	MCQ049800	Damper, Motor	MCQ66469101	COMPLEX LGA170.AGBRBK BK:Black -	
5	MCQ015700	Damper, Connector	MCQ66469001	COMPLEX LGA170.AGBRBK BK:Black -	
5	MCQ074200	Damper, Speaker	MCQ66468901	COMPLEX LGA170.AGBRBK BK:Black -	
5	MCK084400	Cover, Upper	MCK66531103	MOLD PC LUPOY HP-5004 LGA175.ACISWR WR:WINE RED Drawing is same as MCK66531101	
5	MET099500	INSERT, NUT	MICE0016903	MECH_COMMON ZY, ZZ, PRESS, STS, , , , ,	
5	MCQ043300	Damper, LCD	MCQ66493901	COMPLEX LGA170.AGBRBK BL:Blue -	
4	ACQ02	Cover Assembly, Lower	ACQ85300001	LGA170.AGBRBK BK:Black -	
5	MHK000000	Sheet	MHK63445601	COMPLEX LGA170.AITAPW BK:Black -	
5	RAB150000	Magnet, Switch	MMAA0000601	LG-G510 DG, SV, LG-G510, 511, 512 common use, DIA : 3.0mm+1.5t	
5	MJN000000	Tape	MJN67690701	COMPLEX LGA170.AGBRBK BK:Black -	
5	MJN000001	Tape	MJN67675401	COMPLEX LGA170.AGBRBK BK:Black -	
5	MJN089300	Tape, Window	MJN67675301	COMPLEX LGA170.AGBRBK BK:Black -	
5	MEF031100	Hinge, Folder	MEF62262301	COMPLEX LGA170.AITAPW ZZ:Without Color COMPLEX, PCX COMPLEX	
5	MDS000000	Gasket	MDS63610701	COMPLEX LGA170.AITAPW PW:Pearl White -	

Level	Location No.	Description	PartNumber	Spec	Remark
5	MDJ000000	Filter	MDJ63007101	COMPLEX LGA170.AGBRBK BK:Black -	
5	MCQ043300	Damper, LCD	MCQ66469201	COMPLEX LGA170.AGBRBK BK:Black -	
5	MCK046000	Cover, Lower	MCK66531601	MOLD PC LUPOY HP-5004 LGA170.AGBRBK BK:Black -	
5	MCE000000	Contact	MCE62252801	PRESS BECU 0.1 LGA170.AITAPW PW:Pearl White -	
4	ACQ03	Cover Assembly, Front	ACQ85326501	LGA170.AITAPW PW:Pearl White -	
5	MCK032700	Cover, Front	MCK66531701	MOLD PC LUPOY HP-5004 LGA170.AGBRBK BK:Black -	
5	MDJ000000	Filter	MDJ63007201	COMPLEX LGA170.AGBRBK BK:Black -	
5	MET099500	INSERT, NUT	MICE0016907	MECH_COMMON ZY, ZZ, PRESS, STS, , , , ,	
5	MJB000000	Stopper	MJB62670101	MOLD RUBBER LGA170.AGBRBK BK:Black -	
5	MCE000000	Contact	MCE62232901	PRESS BECU 0.2 LGA170.AGBRBK BK:Black -	
5	MCQ000000	Damper	MCQ66688401	COMPLEX LGA170.AITAPW ZZ:Without Color A170 Front Hinge Contact Support PAD	
4	GMZZ00	Screw, Machine	GMZZ0017701	GMZZ0017701 BH + 1.4mM 3mM MSWR NI PLT N - ASIA BOLT	
4	MBL00	Cap, Screw	MBL64819101	COMPLEX LGA170.AGBRBK BK:Black -	
4	MCQ000000	Damper	MCQ66564701	COMPLEX LGA170.AITAPW PW:Pearl White -	
4	MEV000000	Insulator	MEV63673601	COMPLEX LGA170.AGBRBK BK:Black -	
4	MJN061100	Tape, Protect	MJN67750302	PRINTING LGA175.ACISWR WR:WINE RED -	
3	GMEY00	Screw, Machine	GMEY0014301	GMEY0014301 BH + 1.4mM 3.5mM MSWR NI PLT N - KUMGANG SCREW CO., LTD	
3	EBR01	PCB Assembly, Main	EBR73381601	LGA175.ACISWR 1.0 Main	
4	EBR071500	PCB Assembly, Main, Insert	EBR73442101	LGA170.AITAPW 1.0 Main	
5	RAA050101	Resin	BRAH0002601	UNIQUE4000HFW ; , , , , [empty] , , , [empty] SERVEONE CO., LTD.	
5	RAA050100	Resin, PC	BRAH0001301	UF-1060	
5	MEV000000	Insulator	MEV63811001	COMPLEX LGA170.AITAPW BL:Blue -	
5	ABM070300	Can Assembly, Shield	ABM73436601	LGA170.AGBRBK BK:Black -	
5	ADB048600	Dome Assembly, Metal	ADB73558201	LGA170.AGBRBK BK:Black -	

Level	Location No.	Description	PartNumber	Spec	Remark
5	SUMY00	Microphone, Condenser	SUMY0003815	B4010AL443-49 -44DB 2.2KOHM OMNI 1.1TO10V 4x1.0t FPCB GoerTek Inc.	
4	EBR071800	PCB Assembly, Main, SMT	EBR73381701	LGA175.ACISWR 1.0 Main	
5	EBR071600	PCB Assembly, Main, SMT Bottom	EBR73388401	LGA175B.ABRATS 1.1 Main	
6	MCBA00	Can, Shield	MCBA0059201	COMPLEX GD350 CLP ZZ:Without Color -	
5	MEZ000000	Label	MLAZ0038301	COMPLEX LG-VX6000 ZZ:Without Color PID Label 4 Array PRINTING,	
5	EBR071700	PCB Assembly, Main, SMT Top	EBR73388501	LGA175B.ABRATS 1.0 Main	
6	EAX010000	PCB, Main	SPFY0247201	LGA170.AITAZY 1.0 FR-4 SBL - 1.0mm MAIN	
1	AGF000000	Package Assembly	AGF76140807	LGA175.ACISWR ZZ:Without Color LGA175 CIS(EU1/CIS UB/CIS Label_CH/720ea)	
2	MAY047100	Box, Master	MBEE0061001	COMPLEX GD510 CZESV ZZ:Without Color -	
2	MEZ047200	Label, Master Box	MLAJ0004402	COMPLEX CG300 CGR ZZ:Without Color LABEL, MASTER BOX(for CGR TDR 2VER. mbox_label)	
2	MEZ084100	Label, Unit Box	MLAQ0018301	COMPLEX GS200 CISBK ZZ:Without Color PRINTING, Unit Box Label(CIS USE-LGE-Peel-90*40)	
2	MAF086500	Bag, Vinyl	MBAD0005204	COMPLEX LG-LX260 SPRAG ZZ:Without Color -	
2	MAY084000	Box, Unit	MAY65073303	COMPLEX LGA175.ACISWR ZZ:Without Color LGA175 CIS Unit box	
2	MEZ000000	Label	MLAZ0050901	COMPLEX KU990 GBRBK ZZ:Without Color -	
2	AGJ000000	Pallet Assembly	APLY0003911	GT540.ACISBK ZZ:Without Color EU1 TYPE_CIS_CIS Body(SW)+Cap(EU)+AL_720ea	
3	MAY010800	Box, Carton	MBEC0003604	COMPLEX GX300.ACISWR ZZ:Without Color EU1 CIS Body(720ea/H:605mm)	
3	MCCL00	Cap, Box	MCCL0002501	COMPLEX GD510 CZESV ZZ:Without Color -	
3	MPCY00	Pallet	MPCY0012403	COMPLEX KG800 FRABK DB:DARK BLUE -	
1	AAD000000	Addition Assembly	AAD85811501	LGA175.ACISWR WR:WINE RED -	
2	MCK00	Cover, Battery	MCK66531501	MOLD PC LUPOY HP-5004 LGA170.AGBRBK BK:Black -	
2	MEZ000000	Label	MEZ63828501	COMPLEX LGP520.ACISBK ZZ:Without Color -	
2	MEZ002100	Label, Approval	MEZ63927701	COMPLEX LGP500.ACISBK ZZ:Without Color Label (Kazakhstan KST Mark)	

12.2 Replacement Parts <Main component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
7	CN102	Connector, BtoB	ENBY0035901	GB042-40P-H10-E3000 40P 0.4MM STRAIGHT PLUG SMD R/TP 1M - LS Mtron Ltd.	
7	VA101, VA102	Varistor	SEVY0004101	ICVN0505X150FR 5.6V 0% 360F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
7	LD101	LED, Chip	EDLH0015102	19-217/UTD-S887-2/TR8 WHITE 2.7~3.1 30mA 90~180mcd x, y 110mW 1608 R/TP 2P - EVERLIGHT ELECTRONICS CO., LTD.	
7	CN101	Connector, FFC/FPC/PIC	ENQY0014901	GF032-35S-E2000 35P 0.30MM FPC STRAIGHT BOTH SMD R/TP LOCKING - LS Mtron Ltd.	
7	R103	Resistor, Chip	ERHZ0000509	MCR01MZP5J750 75OHM 5% 1/16W 1005 R/TP - ROHM.	
7	R104	Resistor, Chip	ERHZ0000412	MCR01MZP5J122 1.2KOHM 5% 1/16W 1005 R/TP - ROHM.	
7	Q101	TR, Bipolar	EQBN0007101	2SC5585 NPN 6V 15V 12V 500mA 100mA 680 150mW EMT3 R/TP 3P ROHM.	
7	R105	Resistor, Chip	ERHZ0000406	MCR01MZP5J104 100KOHM 5% 1/16W 1005 R/TP - ROHM.	
7	R101	Resistor, Chip	ERHZ0000486	MCR01MZP5J473 47KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R401	Resistor, Chip	ERHZ0000401	MCR01MZSJ000 0OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C217, C228, C229, C231, C232	Capacitor, Ceramic, Chip	ECCH0000117	CL05C270JB5NNNC 27pF 5% 50V NP0 - 55TO+125C 1005 R/TP 0.5 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	U304	IC, Charge Pump	EUSY0238704	AAT3192IJQ-1-T1 SC70JW, 10, R/TP, 2ch charge pump, IC, Charge PumpIC, Charge Pump Advanced Analogic Technologies HK Limited	
6	C102, C201, C204, C230, C344, C348	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R210, R213, R231, R232, R233, R234	PCB ASSY, MAIN, PAD OPEN	SAFO0000401	AX3100 ATL SV_SHIPBACK, MAIN, A, 0OHM DNI	
6	L412, L413	Inductor, Multilayer, Chip	ELCH0001049	1005GC2T6N8JLF 6.8NH 5% - 250mA 0.32OHM 3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R103, R104, R216, R218, R225, R226	Resistor, Chip	ERHZ0000405	MCR01MZP5J103 10KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C221, C235, C306, C313, C317, C321, C322, C411	Capacitor, Ceramic, Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R110, R227, R228, R301, R311	Wire Pad, Short	SAFP0000501	LG-VS760 VRZ	
6	R221, R223, R317, R322	Resistor, Chip	ERHZ0000443	MCR01MZP5J222 2.2KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C108, C115	Capacitor, Ceramic, Chip	ECCH0002002	C1005X7R1A473KT000F 47000pF 10% 10V Y5P -30TO+85C 1005 R/TP - TDK CORPORATION	
6	C104, C105, C110, C118, C119, C120, C124, C129, C216, C234, C303	Capacitor, Ceramic, Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C413	Capacitor, Ceramic, Chip	ECCH0000155	MCH153CN103KK 10nF 10% 16V X7R - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R204	Resistor, Chip	ERHY0000185	RC1005F821CS 820OHM 1% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C219, C226	Capacitor, Ceramic, Chip	ECCH0000179	GRM155R71C223K 22nF 10% 16V X7R - 55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C109	Capacitor, Ceramic, Chip	ECCH0007804	CL05A225MP5NSNC 2.2uF 20% 10V X5R - 55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	L407	Inductor, Multilayer, Chip	ELCH0004707	1005GC2T1N5SLF 1.5NH 0.3NH - 300mA 0.13OHM 7GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C233, C414	Capacitor, TA, Conformal	ECTH0002002	F981A336MSA 33F 20% 10V 3.3A -55TO+85C 6OHM 2.2X1.1X1.1MM - SMD R/TP NICHICON CORPORATION, EAST JAPAN SALES OFFICE	
6	R217, R222	Resistor, Chip	ERHZ0000402	MCR01MZP5J100 10OHM 5% 1/16W 1005 R/TP - ROHM.	
6	FB201, FB202	Filter, Bead	SFBH0008101	BLM15AG601SN1D 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	C107, C117, C122, C307	Capacitor, Ceramic, Chip	ECZH0001216	C1005X5R1A224KT000E 220nF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	C222, C223	Capacitor, Ceramic, Chip	ECCH0006501	GRM21BR60J106K 10uF 10% 6.3V X5R - 55TO+85C 2012 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C220	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R - 55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C123, C304, C305, C315, C320, C412	Capacitor, Ceramic, Chip	ECCH0000161	MCH153CN333KK 33nF 10% 16V X7R - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R219, R220	Resistor, Chip	ERHZ0000204	MCR01MZP5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C101, C312	Capacitor, Ceramic, Chip	ECCH0005604	GRM188R60J106M 10000000 pF, 6.3V, M, X5R, TC, 1608, R/TP, 0.8 mm MURATA MANUFACTURING CO., LTD.	
6	R105	Resistor, Chip	ERHZ0000406	MCR01MZP5J104 100KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R101	Resistor, Chip	ERHZ0000486	MCR01MZP5J473 47KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C224, C236, C237, C409, C410, C416	Capacitor, Ceramic, Chip	ECCH0000143	MCH155CN102KK 1nF 10% 50V X7R - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C125	Capacitor, Ceramic, Chip	ECCH0000151	CL05B472KB5NNNC 4.7nF 10% 25V X7R - 55TO+125C 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R207, R208, R229, R230	PCB ASSY, MAIN, PAD SHORT	SAFP0000401	LG-LU3000 LGTBK, MAIN, A,	
6	C103, C112, C126, C127, C128, C130, C210, C335, C415	Capacitor, Ceramic, Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R - 55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R312	Resistor, Chip	ERHZ0000505	MCR01MZP5J681 680OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C417, L411	Capacitor, Ceramic, Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C111, C302	Capacitor, Ceramic, Chip	ECCH0005603	GRM188R61A225K 2.2uF 10% 10V X5R - 55TO+85C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	
6	VA101, VA102	Varistor	SEVY0004101	ICVN0505X150FR 5.6V 0% 360F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	C202	Capacitor, Ceramic, Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R - 55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R348, R409	Resistor, Chip	ERHZ0000485	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R318, R320	Resistor, Chip	ERHY0003301	MCR01MZP5J101 100OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C113	Capacitor, Ceramic, Chip	ECCH0000113	MCH155A180J 18pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C106	Capacitor, Ceramic, Chip	ECCH0000163	C1005X5R473KDT 47nF 10% 10V X5R - 55TO+85C 1005 R/TP - NEOTECH CO., LTD	
6	L409	Inductor, Multilayer, Chip	ELCH0003819	LQG15HS12NJ02D 12NH 5% - 300mA - - 0.28OHM 3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R314, R404	Resistor, Chip	ERHZ0000404	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	Q201, Q202	TR, Bipolar	EQBP0006301	KTA2014E KTA2014E, , W, R/TP , KEC CORPORAITION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	SW401	connector, RF	ENWY0007601	NMS-306 NMS-306, SMD, dB NAMAE ELECTRONICS INC	
6	C116, C121, C422, C424	Capacitor, Ceramic, Chip	ECZH0001217	GRM155R60J474K 470nF 10% 6.3V X5R - 25TO+70C 1005 BK-DUP - MURATA MANUFACTURING CO., LTD.	
6	R347	Resistor, Chip	ERHY0000128	MCR01MZP5F1502 15KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C203	Capacitor, Ceramic, Chip	ECZH0003503	GRM188R61E105K 1uF 10% 25V X5R - 55TO+85C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	
6	Q101, Q203	TR, Bipolar	EQBN0020501	KTC4075E NPN 5V 60V 50V 150mA 100NA 700 100mW ESM R/TP 3P KEC CORPORAITION	
6	U102	IC, MCP, NOR	EUSY0393701	M36W0R5040U6ZS NOR/32MBIT + PSRAM/16MBIT 1.7VTO1.9V 6x4x1.2 TR 56P NOR+DDR SDRAM BGA * Numonyx Asia Pacific Pte Ltd.	
6	U101	IC, Digital Baseband Processor, GSM	EUSY0419301	PMB7900 0VTO0V 0W 183P - BGA R/TP 183P INFINEON TECHNOLOGIES (ASIA PACIFIC) PTE LTD.	
6	C134	Capacitor, Ceramic, Chip	ECCH0003002	C2012Y5V1A106ZT000N 10uF -20TO+80% 10V Y5V -30TO+85C 2012 R/TP - TDK CORPORATION	
6	U203	IC, MUIC	EAN61847601	RT8964G 2.8 to 5.5 1mSEC 1mSEC 1.471W 2 MUIC Lite Version WQFN R/TP 16P RICHTEK TECHNOLOGY CORP.	
6	R402, R403, R405	Resistor, Chip	ERHZ0000201	MCR01MZP5F1000 100OHM 1% 1/16W 1005 R/TP - ROHM.	
6	U201	IC, Charger	EUSY0410801	RT9524 DFN, 10, R/TP, DFN Cal Test Mode Single Charger IC for Micro USB, IC, ChargerIC, Charger RICHTEK TECHNOLOGY CORP.	
6	CN302	Connector, BtoB	ENBY0036001	GB042-40S-H10-E3000 40P 0.4MM STRAIGHT SOCKET SMD R/TP 1M ENGINEERING PLASTIC UL94V-0 AU OVER NI LS Mtron Ltd.	
6	R224	Resistor, Chip	ERHY0000161	MCR01MZP5F2003 200KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	FB203	Filter, Bead	SFBH0007101	BLM15AG121SN1D 120 ohm 1.0X0.5X0.5 25% 0.25 ohm 0.5A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	L101	Inductor, Wire Wound, Chip	ELCP0008003	MIP2520D3R3M 3.3UH 30% 0V 1.2A 0.1OHM 0HZ 0 SHIELD 2.5X2X1MM NONE R/TP FDK CORPORATION.	
6	C133	Capacitor, Ceramic, Chip	ECZH0025502	GRM219R60J226M 0.000022F 20% 6.3V X5R - 55TO+85C 2012 R/TP 0.85MM MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C114	Capacitor, Ceramic, Chip	ECZH0000839	C1005C0G1H4R7CT000F 4.7pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	L405, L406	Inductor, Multilayer, Chip	ELCH0004721	1005GC2T2N2SLF 2.2NH 0.3NH - 300mA 0.16OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	FB204, FB205	Filter, Bead	SFBH0009901	HB-1M1005-121JT 120 ohm 1.0X0.5X0.5 25% 0.3 ohm 0.5A SMD R/TP 2P 0 CERATECH CORPORATION	
6	R106	Resistor, Chip	ERHZ0000484	MCR01MZP5J471 470OHM 5% 1/16W 1005 R/TP - ROHM.	
6	CN201	connector, I/O	ENRY0008801	GU073-5P-SD-E1500 GU073-5P-SD-E1500, 5, mm, ANGLE LS Mtron Ltd.	
6	X101	Crystal	EXXY0027001	DSX321G-26M(8PF) 26MHZ 10PPM 0F NONE SMD R/TP DAISHINKU CORPORATION.	
6	R108	Resistor, Chip	ERHZ0000476	MCR01MZP5J393 39KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C131, C132, C225	Capacitor, Ceramic, Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R107	Resistor, Chip	ERHZ0000475	MCR01MZP5J392 3.9KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R109	Resistor, Chip	ERHZ0000529	MCR01MZP5J152 1.5KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R303, R309	Resistor, Chip	ERHZ0000488	MCR01MZP5J4R7 4.7OHM 5% 1/16W 1005 R/TP - ROHM.	
6	L404	Inductor, Multilayer, Chip	ELCH0012508	LQP15MN2N0B02D 2NH 0.1NH - 220mA 0.3OHM 6GHZ 13 SHIELD NONE 1.0X0.5X0.35MM R/TP MURATA MANUFACTURING CO., LTD.	
6	X102	Crystal	EXXY0004602	MC-146(12.5PF, +/-20PPM) 32.768KHZ 20PPM 12.5PF 69*14 SMD R/TP SEIKO EPSON CORP	
6	C423	Capacitor, Ceramic, Chip	ECCH0000701	C1005C0G1H1R2CT000F 1.2pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - TDK CORPORATION	
6	L301, L302	Inductor, Multilayer, Chip	ELCH0001403	LL1005-FHL1N0S 1NH 0.3NH - 400mA 0.1OHM 20GHZ 7 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	J201	Card Socket	ENSY0025101	GCA26D-6S-H18-E1500 SIM 6P ANGLE SMD R/TP - LS Mtron Ltd.	
6	C218	Capacitor, Ceramic, Chip	ECZH0003504	GRM188R71E104K 100nF 10% 25V X7R - 55TO+125C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	FB101	Filter, Bead	SFBH0007103	BLM15BB750SN1D 75 ohm 1.0X0.5X0.5 25% 0.4 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	R205	Resistor, Chip	ERHZ0000243	MCR01MZP5F2201 2.2KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	R408	Resistor, Chip	ERHZ0000531	MCR01MZP5J271 270OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R407	Resistor, Chip	ERHZ0000449	MCR01MZP5J243 24KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R302, R310	Resistor, Chip	ERHZ0003001	MCR01MZP5F3002 30KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C301, C310	Capacitor, Ceramic, Chip	ECCH0000138	MCH155CN391KK 390pF 10% 50V X7R - 55TO+125C 1005 R/TP - ROHM.	
6	U301	IC, Speaker Amplifier	EUSY0404001	TPA6202A1ZQVR BGA, 8, R/TP, Class AB SPK Amp, IC, Audio AmplifierIC, Audio Amplifier - BGA R/TP 8P - TEXAS INSTRUMENTS KOREA LTD, HONGKONG BRANCH.	
6	VA401, ZD201	Diode, TVS	EDTY0008606	PRSB6.8C 4.7V 5.7 - - 10W - R/TP 2P 1 PROTEK DEVICES INC.	
6	Q401	TR, Bipolar	EQBN0019201	KTC3770V VSM, 0.1 W, R/TP, 1.2*1.2*0.5 Vcbo=20, Vceo=12, Vebo=2V, Ic=100mA KEC CORPORAITION	
6	L201	Inductor, Multilayer, Chip	ELCH0001556	LL1608-FSLR27J 270NH 5% - 150mA 3.5OHM 470MHZ 8 SHIELD NONE 1.6X0.8X0.8MM R/TP TOKO, INC.	
6	L403	Inductor, Multilayer, Chip	ELCH0005004	HK1005 22NJ 22NH 5% - 300mA 0.6OHM 1.9GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	R304, R305	Resistor, Chip	ERHZ0000203	MCR01MZP5F1002 10KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	R406	Resistor, Chip	ERHZ0003801	MCR01MZP5J5R1 5.1OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R306, R307	Wire Pad, Open	SAFO0000501	AX3100 ATL SV_SHIPBACK, MAIN, A, 0OHM_1005_DNI	
6	C227	Capacitor, Ceramic, Chip	ECCH0000110	MCH155A100D 10pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	U402	IC, Analog Switch	EUSY0186504	FSA2259UMX QFN , 8 , R/TP , Dual SPDT , ; , IC, Analog Switch FAIRCHILD SEMICONDUCTOR	
6	C426	Inductor, Multilayer, Chip	ELCH0004703	1005GC2T1N0SLF 1NH 0.3NH - 300mA 0.12OHM 10GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C403, C404	Capacitor, Ceramic, Chip	ECZH0000810	C1005C0G1H090DT000F 9pF 0.5PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	U401	RF Module	SMRH0006001	SKY77542 MHz, MHz, GSM Dual Band Tx Module for EU. 6x7, SKYWORKS SOLUTIONS INC.	
6	C406	Capacitor, Ceramic, Chip	ECCH0000196	MCH155A0R75C 0.75pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	FL401	Filter, Saw, Dual	SFSB0002801	B9500 942.5 MHz, 35 MHz, 2.8 dB, 15 dB, 1842.5 MHz, 75 MHz, 2.7 dB, 10 dB, 1.8*1.4*0.74, SMD, 925M~960M, 1805M~1880M, 10p, B, 150_56, 150_13, HL, EGSM+DCS RX, 942.5, 1842.5, 1.8*1.4*0.74, SMD, R/TP EPCOS PTE LTD.	
6	L402	Inductor, Multilayer, Chip	ELCH0003814	LQG15HS5N1S02D 5.1NH 0.3NH - 300mA 0.2OHM 5.3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R103, R104, R216, R218, R225, R226	Resistor, Chip	ERHZ0000405	MCR01MZP5J103 10KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C336, C337, C338, C339, C340, C341, C342, C343	Capacitor, Ceramic, Chip	ECCH0000112	MCH155C150J 15pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	LD301, LD302, LD303, LD304, LD305, LD306, LD307, LD308, LD309, LD310	LED, Chip	EDLH0015101	19-217/BHC-ZM1N2QY/3T BLUE 2.7~3.2 25mA 18~45mcd 465~475nm 95mW 1608 R/TP 2P - EVERLIGHT ELECTRONICS CO., LTD.	
6	R318, R320	Resistor, Chip	ERHY0003301	MCR01MZP5J101 100OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R348, R409	Resistor, Chip	ERHZ0000485	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	Q101, Q203	TR, Bipolar	EQBN0020501	KTC4075E NPN 5V 60V 50V 150mA 100NA 700 100mW ESM R/TP 3P KEC CORPORAITION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C102, C201, C204, C230, C344, C348	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	C318	Capacitor, Ceramic, Chip	ECCH0000182	GRM155R61A104K 0.1uF 10% 10V X5R - 55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R328, R329, R330, R331, R332, R333, R334, R335, R336, R337	Resistor, Chip	ERHZ0000496	MCR01MZP5J561 560OHM 5% 1/16W 1005 R/TP - ROHM.	
6	U303	IC, Hall Effect Switch	EUSY0419501	S-5712ACDL 2.5V to 3.3 - SNT R/TP 4P - SEIKO INSTRUMENTS INC	
6	C217, C228, C229, C231, C232	Capacitor, Ceramic, Chip	ECCH0000117	CL05C270JB5NNNC 27pF 5% 50V NP0 - 55TO+125C 1005 R/TP 0.5 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R312	Resistor, Chip	ERHZ0000505	MCR01MZP5J681 680OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R110, R227, R228, R301, R311	Wire Pad, Short	SAFP0000501	LG-VS760 VRZ	
6	R219, R220	Resistor, Chip	ERHZ0000204	MCR01MZP5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	L408	Inductor, Multilayer, Chip	ELCH0001421	LL1005-FHL47NJ 47NH 5% - 200mA 1.3OHM 1.5GHZ 10 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	VA101, VA102	Varistor	SEVY0004101	ICVN0505X150FR 5.6V 0% 360F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	C220	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R - 55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C227	Capacitor, Ceramic, Chip	ECCH0000110	MCH155A100D 10pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C221, C235, C306, C313, C317, C321, C322, C411	Capacitor, Ceramic, Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	L303	Inductor, Multilayer, Chip	ELCH0001402	LL1005-FHL18NJ 18NH 5% - 300mA 0.6OHM 2.8GHZ 10 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	C209	Capacitor, Ceramic, Chip	ECZH0000844	C1005C0G1H680JT000F 68pF 5% 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C104, C105, C110, C118, C119, C120, C124, C129, C216, C234, C303	Capacitor, Ceramic, Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R -55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C131, C132, C225	Capacitor, Ceramic, Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

12.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
2	AFN053800	Manual Assembly, Operation	AFN75374609	LGA175.ACISPW ZZ:Without Color LGA175 manual assy for CIS	
3	MBM087200	Card, Warranty	MCDF0011303	COMPLEX GD350 CISBK ZZ:Without Color -	
3	MFL053800	Manual, Operation	MFL67106410	COMPLEX LGA175.ACISPW ZZ:Without Color LGA175 manual for CIS	
2	SBPL00	Mobile Phone Battery Li-Ion	SBPL0090501	KU250-553450-LGC-EU KU250-553450-LGC-EU, 3.7 V, 950 mAh, 1 CELL, PRISMATIC , KU250 Europe BATT, IP, Pb-Free LG CHEMICAL	
2	EAB010200	Earphone, Stereo	SGEY0003218	EMB-LGE011STKC 3mW 16OHM 115DB 85HZTO126HZ 1M BLACK 5PIN 5 CRESYN CO., LTD	
2	EAY060000	Adapters	SSAD0034901	STA-U35RR 150Vac~350Vac 4.8V 400mA 5060 GOST NONE NONE - SUNLIN ELECTRONICS CO., LTD	